The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XVI. No. 416 JUNE 18, 1927 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.6.0.

Contents

NOTICES :—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.*

Editorial and General Offices: Bouverie House, 154, Fleet Street, London, E.C.4.

Telegrams: "Allangas, Fleet, London." Telephone: City 0244

Research in Government Services

FEW documents among recent publications are of more interest to those concerned with the economic aspects of the profession of chemistry than the report of the Research Special Sub-Committee of the Imperial Conference. Seeing that Lord Balfour presided over this committee and that its personnel comprised such well known men as Sir Ernest Rutherford, Mr. H. T. Tizard, Sir James Currie, Sir Frank Heath, and Sir Walter M. Fletcher, the Committee's report might have been expected to attract more attention than it has.

Some, no doubt, will regard the recommendations of the Committee in the section of their report entitled "Man Power" as more or less Utopian. Few, however, can deny that the principles laid down by this report are, at least in theory, those by which the conditions of the scientific services of Governments should be guided. Incidentally, it may be mentioned that quite a number of the leading firms in chemical industry have already more or less adopted such principles as the Committee recommend in the determination of the conditions of service for their scientific staff. None the less, all who have at heart the true interests of the profession of chemistry will welcome the enunciation of such far-sighted principles, and their widespread dissemination and application will be as much a public service as a service to the economic interests of chemists. It is undoubtedly true, as the Committee point out, that "in the long run the Government services in question . . . must rely for recruits on their own intrinsic merits; special inducements offered at an early stage to tempt young men into a profession cannot make up for inherent deficiencies in the prospects which that profession can provide in salary, pension, status, and opportunities." It is equally true that the application in Government services of the principles to which, by their acceptance of this report at the Conference, the Governments of the Empire are committed, must react on industry, producing there also an upward trend in the status and recognition of the chemist.

In discussing the question of salaries in Government service the Committee maintain that salaries should be sufficient to command independence at the start and to enable the officer to meet the normal requirements of life and of his position at each stage of his career. The importance of officers being relieved of financial and similar worries and free to concentrate on their work is also recognised. It is encouraging to find the recognition that even the entrant to the chemical profession is worthy of his hire. The fashionable talk about the uselessness of the newly qualified graduate to industry for the first few years of his employment is, to say the least, not very helpful. The labourer does not give of his best when he is deemed unworthy of his hire, and the more rapid and generous the recognition of the training and abilities of the young entrant, the more rapid will be his assimilation to the conditions of his chosen profession.

In regard to the treatment of the average officer who does good service without rising to exceptional positions, the recommendations of the Committee are worth pondering. The scale of salary for such men, the Committee find, must rise high enough to enable them to educate their children and to retire on an adequate pension. Furthermore, the interests of men remaining on the research side should be safeguarded by the provision in their own sphere of rewards comparable as to pay, status, and recognition with those of research officers who obtain administrative appointments. It is often too lightly assumed that merit in research should be rewarded by promotion to administrative position. Such promotion may often be folly. The more brilliant a research worker is, the more desirable it is that he should continue to do the work for which he is exceptionally gifted and not work which another, of inferior research ability, for instance, but possessing a gift for administration, would perform at any rate equally well. The exceptional rewards due to a worker of such brilliance should come to him while he continues to display his brilliancy in research.

The whole report should be studied by all scientific

workers and their employers. Only one other point need be mentioned. The Committee stress the importance of status and recognition as well as salary. This has, in the past, been a sore point, especially with chemists engaged in Government service abroad, their status and recognition, apart from salary, comparing unfavourably with that, for instance, of medical officers of similar standing. The question of status and recognition is of primary, not of secondary, importance. It would do much to promote the scientific welfare of this country if this point received adequate recognition not only from a few but from the vast majority of industrial firms as well as from the Government services.

Improving Chemical Trade

THE improvement in chemical overseas trade, disclosed in the Board of Trade returns for April, is fully confirmed in the new returns for May. The comparison is, of course, with the month in which last year's strike began, but the effects of the strike had not then been fully developed, and the figures leave no doubt as to the beginning of a real recovery. The imports for May of chemicals, drugs, dyes, and colours have increased £79,962 on 1926, and £57,924 on 1925; the exports have increased £514,331 on 1926, and £182,990 on 1925; the re-exports have increased £39,835 on 1926, though there is a decrease of £23,497 on 1925. With the exception, therefore, of the last figure, there has been, when a comparison is made of 1927 with both 1926 and 1925, an all-round increase in the volume of chemical overseas trade. This fact will reinforce the gradually returning confidence throughout the industry and produce a most favourable effect generally.

As regards details, a satisfactory feature of the exports is that the increase is general. The only notable exceptions are sulphuric acid and glycerine; moreover, the 1927 figures are in most cases in excess of those for 1925 as well as of those for 1926. Sulphate of ammonia exports have increased from £108,183 in 1926 and £201,228 in 1925 to £329,184 in 1927. The increases are particularly notable in the trade with Spain and the Canaries, Japan, Dutch East Indies, and British West India Islands, but the French market appears to have disappeared from the list. Bleaching powder is some thousands up on both the previous years. Coal tar products, which in 1925 stood at £169,509 and in 1926 at £160,943, have advanced in 1927 to £210,208. Sulphate of copper and disinfectants are both up on last year, though down on 1925, but potassium compounds have advanced from £19,031 in 1925 and £12,188 in 1926 to £27,262 in 1927. Sodium compounds, again, which stood at £318,349 in 1925 and £370,878 in 1926, have now advanced to £425,100. The total exports of chemical manufactures and products, other than drugs and dyestuffs, have advanced from £1,351,302 in 1925 and £1,147,251 in 1926 to £1,569,109 in 1927. Drugs show a distinct advance over last year, and dyestuffs, though slightly down on 1925, are now £67,296 against £53,291 last year. Painters' colours and materials, which have maintained a strong position all through the depression, are better than they stood even in 1925, while comparing 1926 with 1927 the total exports have advanced from £305,071 to £358,640. These figures are of so consistent a character as to leave no doubt about the improvement which is steadily setting in.

The increase in the imports is spread fairly evenly through the industry, but there is a marked decrease in the case of coal-tar products from £59,233 in 1925 and £122,121 in 1926 to £54,065 in 1927. Still more striking is the decline in the imports of intermediates from £1,313 in 1925 to £29 in 1927, and the decrease of imported alizarine from £1,008 in 1925 and £7,108 in 1926 to £434 this year.

The Chemistry of Wool Research

IN connection with the exhibition, organised by the British Research Association for the Woollen and Worsted Industries, which Viscount Novar opened at the Royal Scottish Museum, Edinburgh, on Thursday, an interesting brochure has been issued reviewing the development of wool research in this country. Reference is made in it to a valuable piece of work carried out in the Chemistry Department in the detection of the migration of alkali. By the use of indicator-dyed cloth, records have been obtained of the migration of alkali which takes place all the time scoured cloth is drying off from a damp condition. The most striking result is obtained when the cloth is left standing in cuttled form. The alkali migrates mainly to the edges of the folds and the extreme ends of the piece, and also to the selvedges. Provided the piece is dried off quickly, this migration alone does not cause dyeing faults, but if a piece is allowed to stand semi-damp for a day or two, or if after quick drying is again exposed to damp, dyeing faults corresponding to listed, striped, and ended pieces appear at the places to which the alkali has migrated. This after-effect does not occur with the acidified pieces, which dye up level after subsequent exposure to damp and fungus, although a similar migration of acid takes place during drying.

The Research Association has also carried out an investigation of the chemical factor in scouring, *i.e.*, the absorption of alkali and its effect, and as a result, made proposals for the improvement of the scouring process. The action between soap and wool and the taking up of fatty acid and alkali by the wool during scouring have been investigated. By means of micro-photographs the appearance of a single fibre during scouring and the loosening of scales caused by over-scouring has been observed. The ultimate effect of alkali is to dissolve wool completely, as shown by a solution of wool in caustic soda, and by samples of a wool-cotton fabric before and after removal of the wool by caustic soda. The effects of the alkali absorbed during scouring and how faults arise in unevenly alkaline fabric can be illustrated by patterns showing yellowing of whites and alteration of dyeing affinity, bleeding of colours, and effect on fastness of dyes to sulphur-contaminated air.

The trouble caused to the trade through the use of tar or pitch for sheep branding, sterilising wounds, painting of fences, etc., is well known. Raw wool containing tar and other brands results in scoured wools with the brands remaining. Subsequent processes do not eliminate the tar, and the result is brand-damaged cloth in which tar specks may bleed through several layers in the finishing process. The Research Association has investigated this matter and put forward

as the result sheep branding fluids without tar. The sheep branding fluid made by the Association (B.R.A.) is impervious to the weather, and fleeces after scouring show complete elimination of the marks. This is of the greatest importance to sheep breeders and manufacturers. An antiseptic fluid for painting wounds, etc., has also been produced, which has no permanent marking effect on the wool.

Among other points of interest the bleaching of wool by peroxide and sulphur bleach have been examined. The question of iron contamination, which produces a soiled appearance in sulphur bleached material, has been fully explained. The precise effects of bleaching on the fibre are now known. One of the most important factors in wool processes is the rendering of wool unshrinkable. The prevention of shrinking by chlorination is well known, but the precise effects of the process on the fibre and the results of over-chlorination were not known. Recent work by Speakman and also in the Association laboratories has done much to place this factor on a more definite footing. Another point is the important by-product of wool processes, known as wool grease. It is far from being fully exploited, and the many pure chemicals which can be obtained from it are little known. It has, however, many commercial uses, and it is hoped that the work of the Association will increase these.

Safety in Mines

THERE is one thing at least on which coalowners and coalminers are agreed and that is the need of safeguarding the men, as far as possible, against the inevitable perils of their calling. This agreement was emphasised by the presence of representatives of every organisation connected with the industry at the opening on Tuesday of the new safety in mines research station at Harpur Hill, near Buxton. This new station will continue and extend the research into coal dust explosion initiated by the Mining Association of Great Britain at Altofts and transferred to Eskmeals by the Home Office when that department undertook the work of research into coal dust and other mining dangers. The facilities of the Eskmeals Station proved inadequate and, rather than re-equip it, the Board decided to replace it by a new station in a more accessible situation. The special purposes of the new station are large-scale experimental explosions of coal dust and firedamp, experiments with gob fires and mining explosives, and other work which, owing to its character, can only be conducted in a position of comparative isolation. The Safety in Mines Research Board has another research station at Sheffield for laboratory researches on the same problems, and also on the constitution of coal, on the safe use of electricity in mines, and on the improvement of the miners' safety lamp. That station is at present housed in temporary premises belonging to Sheffield University but will be installed in a new building in Sheffield next year. The two stations are within easy reach of each other and the staffs work in close touch and can easily be interchanged. Researches on methods of supporting underground workings and on wire ropes for mining are being conducted on behalf of the Board at the Imperial College of Science and Technology in London. The Board's scheme of mining research also includes approved researches undertaken by other research bodies or by research workers at universities and similar institutions and supported by grants from the funds allocated to the Board by the Miners' Welfare Committee. The annual expenditure of the Board on all these researches usually amounts to about £50,000, of which about £2,000 is provided by the State and the rest by the Miners' Welfare Fund. The cost of buildings and equipment (excluding equipment transferred from Eskmeals) has amounted to about £35,000 and has been provided by the Miners' Welfare Fund. At the opening ceremony, which was performed by Lord Chelmsford, Sir Edward Troup, the chairman of the Research Board, summed up the position truly by saying that the problems are becoming more and more difficult and complex, and require for their solution the best team work between chemists, physicists, physiologists, electricians, and almost every other type of scientist.

Merchandise Marks

THE first part of the Merchandise Marks Act, 1926, which provides that imported goods bearing the name or trade mark of a British manufacturer or trader shall not be sold unless accompanied by an indication of origin, came into force on Tuesday. The second part of the Act was already in force. On behalf of the Board of Trade, it is pointed out that the common belief that to comply with the Act all imported goods must in future bear the name of their country of origin is quite mistaken. Foreign goods may still be imported and sold with no mark on them at all. But if these goods have any name or trade mark attached, such as may appear to indicate British origin, the Customs officials may refuse to allow them to enter the country unless such marking has by its side a clear indication of the country of origin or they are marked "foreign." The Act did not apply to goods sold directly for export, or to second-hand goods.

Books Received

MODERN STEELWORK. Edited by Ernest Fiander Etchells. London: Nash and Alexander, Ltd. Pp. 190. 5s.

AN INTRODUCTION TO BUILDING SCIENCE. By F. L. Brady. London: Edward Arnold and Co. Pp. 280. 7s. 6d.

The Calendar

June 18	North of England Institute of Mining and Mechanical Engineers: General Meeting. 2.30 p.m.	Newcastle-on-Tyne.
23	Royal Society. 4.30 p.m.	Burlington House, Piccadilly, London.
23	Institute of Chemistry and Society of Chemical Industry (Edinburgh Sections): Visit to Webb and Co.'s Crystal Glass Works. 3 p.m.	Norton Park, Edinburgh.
24	National Physical Laboratory: Annual Visit of Inspection. 3 to 6 p.m.	Teddington.
25	Mining Institute of Scotland: Summer excursion to new Oil Refineries of the Scottish Oils, Ltd.	Grangemouth.
29–30	North of England Institute of Mining and Mechanical Engineers: Annual General Meeting.	Newcastle-on-Tyne.
July 1		
4–8	Society of Chemical Industry: Annual General Meeting.	Edinburgh.

Micro-Organisms in Chemical Industry

I (a).—The Manufacture of Volatile Fuels and Solvents

By G. Malcolm Dyson, Ph.D., A.I.C.

This article is one of a series, in which Dr. Dyson will deal with the application of bacteriological and related methods in chemical industry. Future articles will deal with the production of alcohol and acetone, the preparation of leather, textiles, etc., and the problems of sewage, water, milk, etc.

THE importance of bacteriology in chemical industry is far greater than most chemists imagine, and the study and the use of micro-organisms plays no little part in the production of many of the simpler organic compounds. In some cases, such as the production of alcohol on an industrial scale, and the "classical" example of the production of vinegar by acetous fermentation, the bacterial energies are utilised as agents for the initiation of chemical reactions which could only be otherwise conducted with considerable difficulty; on the other hand, however, the presence of bacterial or fungal growths may be highly injurious to the quality and value of the product, even going so far, as in the case of foodstuffs, as to render it valueless. In such cases, the bio-chemist's task is to devise such precautions or preservatives as will prevent bacterial action. Enormous sums of money are lost annually by substances of all descriptions "going bad," and experience has revealed that, in many cases, the co-operation of the chemist and bacteriologist is able to put an end to such waste and to stabilise the product in question.

It is with such objects in view that several of the leading foodstuffs manufacturers have installed bacteriological and bio-chemical laboratories, from which the bacterial aspect of each stage in the various manufacturing processes is watched and correlated with its function in the economy of the operations under consideration. It may be added that the public—ever interested in "germs"—is beginning to realise that the efficacy of various medicaments, etc., depends on their bactericidal activity, and that food of every description relies to some extent for its wholesomeness on the absence of bacterial contamination, all of which has its consequence in the fact that it seems to be more generally appreciated that a bacteriological certificate is a guarantee of good value.

Instances of Bacterial Action

In chemical industry we find bacterial operations of all kinds being utilised—in some cases without the full realisation that bacterial processes are involved. Particularly may we point out the large part played by such processes in the preparation of leather, the "retting" of flax, the "ripening" of margarine, etc., while the deleterious effects of bacteria and fungal organisms which may be combated by suitable chemical devices are the "moulding" of tobacco and textiles and the bacterial decomposition of canned and preserved foodstuffs. Furthermore, the bacterial aspects of sewage disposal, town's water, and milk supply are, obviously, of sufficient importance to warrant considerable attention.

In this article the application of bacterial action to the production of liquid fuels and solvents is considered. The production of liquid fuel from amylaceous and cellulosic material is a question of considerable importance, especially in America where, according to recent computations, the amount of oil available for transport and power purposes is only sufficient to last for a comparatively short time. The use of alcoholic fuels in place of present ones is the solution to a problem which before long will become very acute. It has the obvious advantage of using an easily repeated cycle of operations, an advantage which the use of coal or petrol does not possess. Thus, sufficient supplies of cellulose material can be grown comparatively easily, year by year, indefinitely, and its conversion into alcohol and use in explosion motors merely returns it to the atmosphere as carbon dioxide, which is re-assimilated into the cycle by the plant life. It must be admitted, however, that at present the weak link in the chain is the production of alcohol from a suitable cheap raw material. However, good results have already been obtained and research is still in progress on the problem.

The advantages of a bacterial system of manufacture are manifold. In the first place they continue evenly and smoothly without very much supervision and do not entail the use of costly reagents. Secondly, the yields are good, and in the majority of cases can be obtained in a pure condition by simple operations on the fermented material, whilst a third advantage lies in the fact that the labour cost of a fermentation process is not usually very high.

Conditions of Bacterial Action

There are, however, several disadvantages attendant on the fermentation type of process which add considerably to the technical difficulties. In the first place, bacteria and moulds are very sensitive organisms requiring carefully adjusted conditions before they can exert their optimum activity. Thus, for example, the temperature of the fermentation mash is of considerable importance, many organisms growing best at about 30° to 35° C., whilst others have their optimum temperature between 20° and 26° C. Furthermore, the p_H value of the fermentation medium, and the constitution of the latter from the point of nutriment are two very important factors. As a general rule, bacteria and moulds will not grow in highly acid or alkaline media, and in any case they cease to grow when the concentration of the desired product reaches a certain limiting value. This means that the bulk of liquid to be handled is enormous when compared to the volume of the final product, a fact which renders extensive plant necessary, and makes the fuel costs for evaporation, distillation, etc., heavy. This latter question is, perhaps, the most serious objection to the use of fermentation processes.

One point which is frequently overlooked in connection with fermentation processes, is the liability to accidental contamination of undesirable bacteria. Seeing that these bacteria or their spores are floating about the air of any factory, it is next to impossible to prevent this contamination. One of the most common and injurious organisms in this respect is the *Bacillus Butyricus*, which will grow in almost any medium with the production of butyric acid. When a fermentation vat has been so contaminated it very often happens that the *B. Butyricus* grows to the exclusion of the desired organisms, and nothing remains but to throw the whole contents away, disinfect the vat, and start again.

Although the fundamental processes involved are the same, there is usually a sharp line drawn by most workers between the action of fermentation organisms and enzymes; between, for example, the action of yeasts, and the action of enzymes such as trypsin, emulsin, etc. Such a distinction, it should be pointed out, is very artificial, the ferment activity of the various organisms being due to enzymes secreted during the middle stages of their life processes. Neither the constitution of enzymes nor their mechanisms of action are at all thoroughly understood. Certain enzyme actions resemble the oxidations and reductions brought about by such catalytic agents as colloidal palladium and platinum, and for this reason the enzymes have been called "organic catalysts."

The Mechanism of Enzyme Action

Change of name, however, does not bring us any nearer an explanation, and their mechanism of action is still obscure. In contradistinction to the inorganic catalysts, the enzymes show the phenomenon of specificity—"one enzyme one job"—a fact which is admirably demonstrated by the series of enzymes which are responsible for the degradation of starchy matter in the animal digestive tract. In this system the starch is broken up step by step, each step requiring the presence of a different enzyme. There seems, however, little doubt that enzymes are colloidal in nature and that part of their activity at least is due to the adsorption of the matter to be split up at the molecule-liquid interface, a state of things which, added to the fact that colloids have no physical criteria of purity, adds considerably to the difficulties of preparing pure specimens of enzymes.

Even apart from the production of alcoholic beverages for human consumption, the production of industrial alcohol is, perhaps, the widest application of microbiology to industrial chemistry. To epitomise the process, starchy or cellulose

material is converted to sugars and the sugar to alcohol, the former part of the process being far more difficult to bring about than the latter, and as is usual with such processes a whole series of enzymes is again called into play to bring about the desired result. This is very well illustrated by the changes which take place when starch is broken down. In the first place, the starch itself is changed into soluble starch, which although insoluble in cold water, is soluble in water at 50° C. and gives a wine red colour with iodine. It has a slight reducing power, equal to 6 per cent. of that of glucose. Further enzyme action converts soluble starch, through erythrodextrin to achroodextrin, which gives no colour with iodine at all and which has 12 per cent. of the reducing action of glucose. This substance is then further split up into maltose and achroodextrin α, of similar reducing power, which in turn gives maltose and achroodextrin β, the reducing power of which is 29 per cent. of that of glucose. Achroodextrin β gives maltose and finally glucose by two further enzyme operations. This degradation is shown in tabular form below and can be observed by means of polarimetric readings on the fermenting liquid, as shown.

Reaction.	$[A]_D^{20°}$ of the product.
Starch + H_2O → soluble starch + maltose	218°
Soluble starch + H_2O → erythrodextrin + maltose	—
Erythrodextrin + H_2O → achroodextrin + maltose	210°
Achroodextrin + H_2O → achroodextrin α + maltose	190°
Achroodextrin α + H_2O → achroodextrin β + maltose	150°
Achroodextrin β + H_2O → maltose + maltose	150°
Maltose + H_2O → glucose	50°

Similar processes, modified, of course, in certain cases according to the material to be operated on, are used for the production of alcohol from all kinds of material, including potatoes, mangolds, molasses, prickly pear, etc. In nearly all such fermentations glucose is the basic intermediate, and it is the glucose that is fermented by the yeast in order to produce the alcohol. Taking as an example the case of potato starch fermentation, the technique is usually as follows: After a preliminary washing to remove mud, etc., the potatoes are chipped small and the chips allowed to feed by gravity into a large pressure digester. A preliminary heat up is given with the valve of the digester open, after which it is shut down and kept closed until the pressure has risen to about 60 lb. At this stage a small valve at the top of the digester is opened and the escape of steam, whilst insufficient to materially alter the pressure inside the vessel, is violent enough to throw the contents into rapid motion, thus ensuring a rapid and complete treatment of the starchy mass.

This treatment goes on for about an hour, after which the steam is cut off, and the charge allowed to cool to about 100° C. Vacuum is now applied, and while the water is removed the temperature rapidly falls to about 55° C., at which point crushed malt equal in weight to 2 per cent. of that of the original charge is added. Stirring is continued throughout the operation, and with suitable agitation the diastase of the malt will convert the starch into fermentable sugar in 15 minutes. The end-point of the process is taken at that instant when the mash has completely lost its ability to react with iodine, giving neither a blue nor a red colour. The mash has by now reached the stage when yeast fermentation will break up the sugar. Consequently, after cooling to a temperature between 15° and 20° C., according to the strain of yeast used, the mash is inoculated with a secondary yeast culture.

The Yeast Fermentation

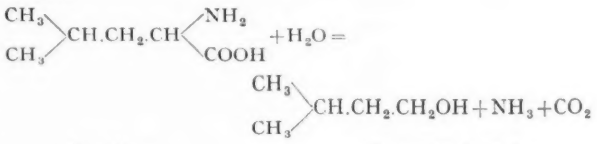
The progress of a yeast fermentation is usually comparatively regular; by about twelve hours after inoculation the charge will be gassing freely and the temperature will have risen. Artificial cooling with cold water coils is resorted to in order to keep the temperature well below 30° C., since the loss of alcohol by evaporation becomes considerable at this temperature. In actual plant practice the fermentation process has to be kept under close observation, since the presence of organisms other than yeasts may lead to the formation of products other than alcohol. Thus, as was mentioned above, the *B. Butyricus* is a frequent cause of souring of the mash, and not only contaminates the mash with butyric acid but seriously inhibits the yeast fermentation. The presence of a fair amount of *Bacillus acidi lactici* exerts a beneficial effect on the progress of the fermentation by providing just so much acid as will not interfere with the yeast action, but will suppress the growth of many organisms with which all starchy matter is contaminated. In many factories this is brought about by allowing the mash to stand for some time at 55° C. before the yeast is added. At this temperature the *B. acidi lactici* flourishes and in twenty-four hours has produced the requisite acidity.

Such a process is always used where starchy matter from maize corn, potatoes, fruit pulp, etc., is to be fermented for alcohol, although various small differences of technique are discernible. The mechanism of the fermentation of glucose to alcohol is still obscure, although it has been the subject of more investigation than almost any other bio-chemical problem. The apparent reaction

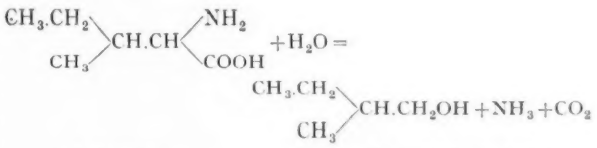
$$C_6H_{12}O_6 = 2C_2H_5OH + 2CO_2$$

represents only the fate of some 90 per cent. of the glucose, since Pasteur showed that in addition to the higher alcohols both glycerol and succinic acid are produced, whilst later re-examination of the reaction has revealed that acetic and propionic acids are present, together with small traces of aldehydes and esters.

Yeast is a very rapidly growing cellular organism which secretes the enzymes bringing about the main changes of alcoholic fermentation, a fact that has been shown by using expressed yeast free from cells for the fermentation. It is a noteworthy fact that neither higher alcohols nor succinic acid are produced during fermentation with pure yeast juice. This points to the fact, later elaborated by Ehrlich, that those two products at least must be the direct products of yeast metabolism rather than of its glucolytic enzymes, probably within the yeast cell itself. The substances upon which these enzymes act are the various amino acids derived from the protein matter necessary for the growth of the yeast cell. Thus *iso*amyl and secondary butyl alcohol, the two principal higher alcohols produced during alcoholic fermentation, are obtained by simple enzyme action upon leucine and *iso*-leucine.

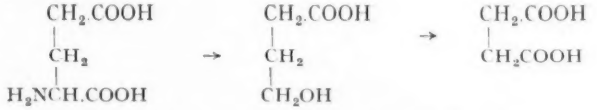


Leucine. *Iso*amyl alcohol.



*Iso*leucine. *Sec*-Butyl alcohol.

Succinic acid is produced by slightly different action from glutamic acid :—



It has been shown that both oxidases and reductases are present in the living yeast culture, and various investigators have given schemes by which the glucose may be degraded by these and other enzymes. There seems to be a common agreement among many that methylglyoxal is the fundamental intermediate, and that it is produced via glyceric aldehyde and dihydroxyacetone. Differences of opinion, however, exist as to the precise method in which the methylglyoxal is utilised. Part is undoubtedly converted to glycerol, and the remainder, it has been suggested, is converted via pyruvic acid and acetaldehyde to alcohol. Others maintain that lactic acid is the intermediary and not pyruvic, and that it is obtained by simple oxidase reaction of methyl glyoxal in its enol form.

Chemical Trade Returns for May

All-round improvement in Exports and Imports

THE Board of Trade returns for May indicate that the imports of chemicals, drugs, dyes, and colours for the month ended May 31, 1927, were valued at £1,119,383, an increase of £79,962 on the imports of the corresponding period of 1926; exports amounted to £2,241,789, an increase of £514,331 on 1926; while re-exports of imported merchandise were £88,946, an increase of £39,835. For the five months ended May 31, imports amounted to £6,830,250 (an increase of £675,862); exports to £9,542,542 (a decrease of £66,434); and re-exports to £386,498 (a decrease of £64,285).

Imports

	Quantities. Month ended May 31,		Values. Month ended May 31,	
CHEMICAL MANUFACTURES AND PRODUCTS—	1926.	1927.	1926. £	1927. £
Acid Acetic .....tons	835	797	34,818	36,291
Acid Tartaric .....cwt.	2,732	3,370	12,412	17,681
Bleaching Materials ,,	8,206	8,127	7,186	10,558
Borax..... ,,	6,408	10,399	7,139	12,087
Calcium Carbide... ,,	36,184	53,889	23,569	32,824
Coal Tar Products, not elsewhere specified value	—	—	122,121	54,065
Glycerine, Crude.. cwt.	—	1,459	—	5,239
Glycerine, Distilled ,,	42	301	176	1,413
Red Lead and Orange Lead..... cwt.	4,089	5,906	7,377	10,205
Nickel Oxide..... ,,	2,021	57	11,465	330
Potassium Nitrate (Saltpetre) ..... cwt.	6,527	9,156	7,160	9,927
Other Potassium Compounds .....cwt.	108,462	169,693	35,726	55,550
Sodium Nitrate.... ,,	123,116	72,364	78,061	50,648
Other Sodium Compounds .....cwt.	37,280	42,083	26,069	26,758
Tartar, Cream of .. ,,	2,481	4,773	8,808	18,700
Zinc Oxide ..... tons	696	1,071	26,320	34,913
All other sorts....value	—	—	222,067	223,117
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts ..... oz.	81,840	179,033	6,934	14,080
Bark Cinchona ... cwt.	1,389	3,740	6,519	15,444
Other Sorts ..... value	—	—	79,148	135,014
DYES AND DYESTUFFS, ETC.—				
Intermediate Coal Tar Products ..... cwt.	—	2	—	29
Alizarine ..... ,,	150	17	7,108	434
Indigo, Synthetic . ,,	—	13	—	91
Other Sorts ..... ,,	2,865	3,600	70,430	76,806
Cutch ..... ,,	7,167	4,011	12,730	7,184
Other dyeing extracts ,,	1,312	4,068	4,737	12,578
Indigo, Natural ... ,,	57	—	1,290	—
Extracts for Tanning ,,	65,893	94,619	60,604	94,461
PAINTERS' COLOURS AND MATERIALS—				
Barytes, Ground, and Blanc Fixe ..... cwt.	58,663	55,814	13,495	12,459
White Lead (dry).. ,,	12,514	10,208	23,576	16,200
All other sorts .... ,,	136,749	101,264	122,376	133,697
Total of Chemicals, Drugs, Dyes, and Colours ..... value	—	—	1,039,421	1,119,383

Exports

CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Sulphuric ... cwt.	5,162	1,248	4,327	1,996
Acid Tartaric ..... ,,	783	1,392	4,295	9,092
Ammonium Chloride (Muriate) .....tons	316	384	8,915	9,050
Ammonium Sulphate—				
To France .....tons	—	—	—	—
Spain and Canaries tons	1,968	17,132	24,148	180,609
Italy..... ,,	350	360	4,455	3,843
Dutch East Indies,,	623	1,148	7,837	12,889
Japan..... ,,	1,797	8,158	23,020	90,774
British West India Islands and British Guiana.. tons	177	728	2,166	8,349
Other Countries ,,	3,698	2,961	46,557	32,720
Total ..... ,,	8,613	30,487	108,183	329,184

	Quantities. Month ended May 31,		Value. Month ended May 31,	
	1926.	1927.	1926. £	1927. £
BLEACHING POWDER..cwt.	11,578	57,208	7,083	26,183
COAL TAR PRODUCTS, ETC.—				
Anthracene ..... cwt.	1,000	—	437	—
Benzol and Toluol galls.	535	3,853	73	472
Carbolic Acid ..... cwt.	10,859	13,282	17,511	28,771
Naphtha .....galls.	784	3,009	64	456
Naphthalene ..... cwt.	275	880	215	694
Tar Oil, Cresote Oil, etc. .....galls.	4,175,437	4,115,464	126,740	137,589
Other Sorts cwt.	23,141	68,759	15,903	42,226
Total .....value	—	—	160,943	210,208
COPPER, Sulphate of . tons	4,026	5,432	84,847	118,628
DISINFECTANTS, ETC. cwt.	28,551	34,111	67,099	82,260
Glycerine, Crude .. cwt.	5,714	3,678	15,257	12,048
Glycerine, Distilled .. ,,	13,883	6,259	58,817	30,683
Total ..... ,,	19,597	9,937	74,074	42,731
POTASSIUM COMPOUNDS—				
Chromate and Bichromate..... cwt.	702	2,874	1,323	5,247
Nitrate (Saltpetre) ,,	439	1,785	923	3,584
All other Sorts ... ,,	3,177	4,517	9,942	18,431
Total ..... ,,	4,318	9,176	12,188	27,262
SODIUM COMPOUNDS—				
Carbonate ..... cwt.	444,364	516,670	141,927	149,348
Caustic..... ,,	172,568	248,477	124,354	177,518
Chromate and Bichromate..... cwt.	1,654	2,143	2,329	3,659
Sulphate, including Salt Cake ..... cwt.	73,359	93,280	12,937	12,229
All other Sorts ... ,,	49,387	62,210	89,331	82,346
Total ..... ,,	741,332	922,780	370,878	425,100
ZINC OXIDE ..... tons	57	115	2,446	5,031
All other Sorts ... value	—	—	241,973	282,384
Total of Chemical Manufactures and Products (other than Drugs and Dyestuffs) .....value	—	—	1,147,251	1,569,109
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts ..... oz.	86,173	123,096	9,975	15,652
All other Sorts... value	—	—	211,870	231,092
Total ..... ,,	—	—	221,845	246,744
DYES AND DYESTUFFS—				
Products of Coal Tar cwt.	6,266	6,275	47,049	59,097
Other Sorts ..... ,,	4,383	5,045	6,242	8,199
Total ..... ,,	10,649	11,320	53,291	67,296
PAINTERS' COLOURS AND MATERIALS—				
Barytes, Ground, and Blanc Fixe ..... cwt.	460	1,533	216	639
White Lead (dry).. ,,	7,359	6,722	15,588	13,029
Paints and Colours in paste form ..... cwt.	45,330	56,964	104,012	118,024
Paints and Enamels Prepared (including Ready Mixed) ..... cwt.	27,129	32,727	88,272	114,569
All other Sorts ... ,,	50,103	62,535	96,983	112,379
Total ..... ,,	130,381	160,481	305,071	358,640
Total of Chemicals, Drugs, Dyes, and Colours ... value	—	—	1,727,458	2,241,789

Re-exports

	Quantities. Month ended May 31,		Value. Month ended May 31,	
CHEMICAL MANUFACTURES AND PRODUCTS—	1926.	1927.	1926. £	1927. £
Acid Tartaric ..... cwt.	83	140	495	843
Borax..... ,,	100	40	170	36
Coal Tar Products. value	—	—	678	10
Glycerine, Crude .. cwt.	—	—	—	—
Glycerine, Distilled ,,	—	—	—	—
Potassium Nitrate (Saltpetre) ..... cwt.	56	140	79	175
Sodium Nitrate ... ,,	1,281	948	847	635
Tartar, Cream of .. ,,	135	713	619	3,025
All other Sorts ..value	—	—	12,252	39,850
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	12,137	10,832	1,578	1,087
Bark Cinchona ...cwt.	346	146	4,377	654
All other Sorts....value	—	—	20,807	32,992
DYES AND DYESTUFFS—				
Cutch ..... cwt.	848	1,276	1,331	1,900
Other Dyeing Extracts ,,	89	147	435	1,103
Indigo, Natural ... ,,	—	9	—	218
Extracts for Tanning ,,	1,480	392	1,488	625
PAINTERS' COLOURS AND MATERIALS..... cwt.	898	1,019	2,909	4,975
Total of Chemicals, Drugs, Dyes, and Colours .... value	—	—	49,111	88,946

The Holley Moulding Process

To the Editor of THE CHEMICAL AGE.

SIR,—In the very full report that you were good enough to give of Professor Hinchley's paper on the Holley Moulding Process, you report Mr. J. E. Fletcher as follows (*C.A.*, Ap. 30, 1927, p. 422) :—

"Mr. J. E. Fletcher, who had seen the plant at work, said that a great deal of time had been devoted to experiment before the exact composition of the metal to be used had been arrived at. It was not metal which we in this country would call high class, and if it were not for the fact that it was poured into metal moulds and cooled quickly, the castings would be unsound and coarse grained. To see the plant in operation was an inspiration. The metal was quite good enough for the purpose for which it was used, and the castings stood up to the pressure to which they were subjected."

A characteristic analysis of our iron is as follows :—

	Per cent.
Total carbon	3·50
Silicon	2·55
Phosphorus	0·285
Sulphur	0·085
Manganese.....	0·65

In the Detroit area such an iron results from a mixture of one-half 1 pig and one-half first class automobile scrap, with a very small percentage of high silicon pig to maintain the silicon above 2·5 per cent. This iron, as any American foundryman will agree, is eminently suitable for the making of grey iron castings in green sand moulds, without any unusual porosity resulting.

For some years we have used this iron in the production of the exhaust manifolds for the Fordson tractor, the same iron that is now being poured into the metal moulds being poured into the sand moulds. This casting weighs 22 lb., and is now being satisfactorily and economically made in the metal moulds with exactly the same iron as was used with the sand moulds.—Yours, etc., HOLLEY CARBURETOR CO.,

S. M. UDALE, A.M.Inst.C.E.

Vancouver Avenue, Detroit, Mich.

Safeguarding of Key Industries

THE Board of Trade give notice that representations have been made to them under Section 10 (5) of the Finance Act, 1926, regarding ethylene bromide ; lead tetra-ethyl ; monochlornaphthalene ; and R. potassium hydroxide.

Any person desiring to communicate with the Board of Trade with respect to the above-mentioned applications should do so by letter addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, S.W.1, within two months from the date of this notice (June 15).

Mr. Woolcock on Technical Education

Address to Association of Teachers

ADDRESSING the annual conference of the Association of Teachers in Technical Institutions at Plymouth, in connection with which a science and industry exhibition was held which came to an end on Saturday, June 11, Mr. W. J. U. Woolcock dealt with the relations between industry and technical education and pleaded for better co-operation between industrialists and educationists. Teachers in technical schools, he suggested, should not be content when they were thinking along purely scientific lines, but must realise even more than they did at present that they were aiming not only at teaching science, but at teaching it in such a way that those who learned it from them might be able to apply the knowledge given.

The chemical industry was among the first six of the big industries of this country. That was a rather startling thing to discover, because they had always believed and accepted without question for many years that there was one chemical industry, and that it was situated along the banks of the Rhine. But to-day the chemical industry had taken its place among the six greatest industries in England. There were two hundred million pounds of capital invested in it at present, and more than a quarter of a million people were earning their living in it. It was to that industry that most of the boys and girls who passed through the hands of the teachers in technical institutions would go. Speaking of the industry's history, Mr. Woolcock said that more than a century ago there was planted in England the alkali industry (the beginning of what was known as the heavy chemical industry), which, linked up with the sulphuric acid industry, formed a very good index of the prosperity of the industry of the country. To-day they had reached another development, which was taking place right under their eyes, and he believed they were about to witness what was going to be the biggest march forward that science had ever seen.

Importance of Economics

Undoubtedly the chemical industry provided a bigger outlet than any other in the country for the students from technical institutions, but there were many industries which managed to carry on without any scientific aid whatever. There an opportunity was offered for the student with common sense and a scientific knowledge, as he would be able to use his training to improve a business which had previously been run on rule of thumb lines. Although technical institutions were turning out some very well trained men, a point of criticism was that the latter were lacking in that knowledge of economics which was so essential to the point of view of the industrialists. Mr. Woolcock said he believed it was possible for teachers to implant knowledge in such a way that while scientific information was being obtained, there was always running through it an inquiry as to how it was going to be applied economically. While teachers had got their minds fixed very firmly on giving the students a proper grounding in science as far as possible with an application to industry, they were not paying quite sufficient attention to these details. There had not been a sufficient liaison between the industrialists and the educationists, and in his judgment the fault lay with both, and the blame could be apportioned fifty-fifty. The position was better than it was a few years ago, but nevertheless it was pretty bad to-day. Mr. Woolcock closed his address by appealing for a better understanding between teachers and business leaders, and emphasising the necessity for an economic outlook.

I.C.I. Mixed Fertilisers

ADDRESSING the Darlington Rotarians on Friday, June 10, on "Synthetic Ammonia and Its Relation to Food Production," Captain Cowap said that Imperial Chemical Industries, Ltd., had been experimenting with a view to the production of a mixed fertiliser which should contain ammonia, lime, sulphate, superphosphate, etc., so that the farmer could apply the whole in one dressing of the land instead of having to give separate dressings of each of the fertilisers. Captain Cowap stated that Brunner, Mond and Co., who took over the Government works at Billingham, and Synthetic Ammonia and Nitrates, Ltd., had found the 250 acres of land insufficient. They had now something like 900 acres, about 7½ miles round, a mile wide, and a mile and a half long, with a frontage on the Tees and abundant water supply.

Motor Fuels From Coal

A Review by A. C. Fieldner

PERFECTION of certain processes for the carbonisation of coal may be expected to provide substitutes for oil and gas, if needed in the future, states Mr. A. C. Fieldner, superintendent of the Pittsburgh Experiment Station, the Bureau of Mines, Department of Commerce. Mr. Fieldner, who was detailed by the Bureau of Mines to investigate various European processes for the low-temperature carbonisation of coal, and who is well known to fuel experts in this country, suggests that in the ideal process the full yield of primary oils will be extracted from the coal by carbonising at gradually increasing temperatures to remove all the volatile matter from the coke. Then the coke will be converted by way of the water-gas reaction to carbon monoxide and hydrogen, which, when heated under high pressures in steel autoclaves in the presence of suitable catalysts, may be converted into alcohols suitable for motor fuel. Dr. Fischer, of the Institute of Coal Research at Mülheim-Ruhr, Germany, has succeeded in making such a mixture of alcohols ranging from methanol to an alcohol containing nine carbon atoms. This mixture, termed "synthol," was made at 150 atmospheres pressure and 400° C. by use of a catalyst composed of iron oxide impregnated with alkali. The fuel gave satisfactory service in a motor-cycle engine. Methanol is now made in Germany by a similar process in copper-lined autoclaves, with zinc oxide as catalyst, at a manufacturing cost of 18 cents a gallon.

The Bergius process, recently developed in Germany for converting coal into oil, also offers great possibilities for the treatment of western bituminous and sub-bituminous coal. In this process, as used at Mannheim, pulverised coal, mixed with oil or tar to form a thick paste, is heated at 400° C. in a steel autoclave under a pressure of 150 to 200 atmospheres of hydrogen. Under these conditions the coal is converted into a black, tarry liquid which, on distillation up to 300° C., yields oils and tar to the extent of 30 to 60 per cent. of the weight of the coal. The by-products are ammonia and gas. This process, Mr. Fieldner considers, could provide in the future ample quantities of substitutes for the products now obtained from petroleum. Reserves of coal in the United States are ample for many years.

Low-temperature Carbonisation

Low-temperature carbonisation of coal is defined as the heat treatment of coal in the absence of air at temperatures of 450° to 700° C. as distinguished from the usual high-temperature carbonisation at temperatures of 900° to 1,200° C. The aim is to keep the temperature low enough to prevent the decomposition of the primary tar and thus obtain the maximum yield of liquid products and at the same time produce a solid smokeless fuel. At 450° to 500° C. the tar yield is two or three times that of the ordinary high-temperature process for making coke or gas.

The reasons for the many attempts to devise low-temperature processes that would work on a commercial scale are as follows: To obtain a larger yield of liquid fuels than can be obtained from high-temperature processes; to provide a smokeless, easily ignitible solid fuel for domestic purposes; to obtain a dry, easily pulverised, highly combustible, low-volatile material for pulverised-fuel furnaces, and at the same time to recover by-products; to obtain a substitute for low-volatile semi-bituminous coal, for mixing with high-volatile swelling coals in order to make a suitable dense metallurgical coke.

Of these four objectives, the one common to all low-temperature processes is the increased yield of oil or tar. Liquid fuel, especially gasoline, seems essential for the continuation of a highly developed system of automotive transportation. European countries which have no oil fields within their boundaries take a particularly keen interest in this problem because of the need of a home source of petroleum substitutes in the event of a war shutting off foreign supplies. Great Britain felt this need during the last war to such an extent that the Government established a fuel research station which has for one of its important problems the development of a low-temperature process that is commercially feasible. Germany actually did install and operate a number of low-temperature carbonisation plants during the latter years of the war. There is in England a second objective almost as important as the first—namely, the manufacture of an easily ignitible smokeless fuel for open-grate fires.

In Germany and in France research on low-temperature carbonisation is undertaken mainly for the production of gasoline and fuel-oil substitutes and for manufacturing a low-volatile semi-coke for mixing with high-volatile gas coals to produce dense metallurgical coke. There is little interest at present in a smokeless domestic fuel. German engineers are investigating the possibilities of combining low-temperature carbonisation with powdered-fuel firing or of burning the semi-coke on chain-grate stokers in large central power plants. Considerable attention has also been given to combining low-temperature distillation with complete gasification of the resulting semi-coke in by-product gas producers.

From a consideration of the many different processes that have been and are being tried experimentally it is evident that no one process has yet proved an unqualified technical success. Each has its peculiar problems yet to be solved and a number have shown promise under certain favourable conditions. The processes that depend on internal heating are simpler and require less capital expenditure per ton of coal carbonised, but they are limited to non-coking coals, weakly coking coals, or briquetted or pretreated coals; also the gas is of low calorific value and the light oils cannot be recovered from the diluted gas except when the heating agent is superheated steam. Such processes, however, are promising for future development in combination with large central power plants or industries using large quantities of gas of low heating value when diminishing supplies of petroleum shall create a demand for the oils obtainable by low-temperature carbonisation.

The processes that show relatively higher costs and use externally heated retorts will probably find their most advantageous field in making relatively high-priced smokeless domestic fuel from a cheap non-coking or poorly coking coal and producing also a gas of high thermal value. These processes also yield several gallons of light oil that is not to be had from internally heated processes. Local economic conditions and the type of coal available are important factors governing the selection of the most suitable process.

The commercial success of low-temperature carbonisation of coal in the near future must depend mainly on the sale at an adequate price of the solid product (smokeless fuel) rather than on the liquid and gaseous by-products. The by-products are important contributing factors, but they cannot carry the entire cost of processing the coal under the present competition of petroleum fuels. It does not follow, however, that low-temperature carbonisation cannot be developed to make a high-priced fuel from low-priced non-coking coals. In the Central and Western States there is relatively little coking coal, and the non-coking coals are not suitable for by-product coke ovens. Because of the fairly large margin between the cost and the selling price of the processed fuel it seems possible to work out a low-temperature process that can compete with high-temperature processes which require more expensive raw material in supplying the smokeless fuel requirements of this region.

The results of Mr. Fieldner's investigations are contained in Bureau of Mines Technical Paper 396, "Low-Temperature Carbonisation of Coal," which may be obtained from the Superintendent of Documents, Washington, D.C., at 15 cents.

U.S. Production of Potash in 1926

POTASH produced in the United States in 1926 amounted to 46,324 short tons of crude potash salts, containing 23,366 short tons of potash (K_2O), according to the United States Bureau of Mines, Department of Commerce. Sales by producers amounted to 51,369 tons of crude potash, containing 25,060 tons of K_2O. The potash materials of domestic origin, sold by producers in 1926, were valued at $1,083,064, f.o.b. plants. About 26,000 tons of crude potash, with an available content of 9,000 tons of K_2O, remained in producer's stocks at December 31, 1926. The production was chiefly from natural brines in California and distillery residue from molasses in Maryland. Small amounts were also obtained from steel plant dust in Pennsylvania, alunite in Utah, and glauconite in Delaware.

Oil, Chemical, and Colour Exhibition

Some Interesting Exhibits

A FEATURE of the International Oil, Chemical, and Colour Trades Exhibition, which closes at the Agricultural Hall, London, N.1, to-day, is shown in the large number of the smaller manufacturers who are exhibiting. Stands are well arranged and the exhibits form a comprehensive display of machinery, chemicals, and materials for use chiefly in the varnish and colour trades.

One of the most interesting stands is that of the Fuller's Earth Union, where several inquiries of scientific interest have been received about the use of Fuller's earth as a base for colours, an application of the product which opens up interesting possibilities in the paint direction or as a rubber-filler. The solution of dye used is a one per cent. solution, and the intensity of colouring produced has given rise to some scepticism as to whether this was actually the strength of dye. The explanation is that the natural alkalinity of the earth increases the intensity of colouring considerably. "Osmo" Kaolin, a neutral gritless colloidal clay, is also exhibited. An exhibit of interest to firms engaged in the manufacture of cellulose paints is "Sacholith," a 100 per cent. zinc sulphide of intense whiteness and opacity made by "Sachtleben A.G.," of Cologne.

Hart Colours, Ltd., who issue a most attractive brochure, show many examples of pigments and lakes for wall paper coating, paints, printers' ink, lime colours, and calico printing, a particularly fine example being the pure potash bronze blue. A rubber waste grinder and sifter was illustrated among other machines on the stand of William Gardner and Co. (Gloucester), Ltd., who said that a certain number of inquiries had been received, chiefly from old clients. The Cornbrook Chemical Co. expressed the opinion that inquiries would increase towards the end of the week.

Inquiries at International Combustion, Ltd., and Buhler Brothers, showed that a fairly steady, although not numerous, flow of inquiries had been received. On the foreign side, there is the Building Metal Export Co., of Brussels, where are shown samples of white lead made by the Kalkhoff process, several grades of red lead, and litharge of Italian manufacture. The Utrechtsche Machinefabrik O.D. Frans Smulders show oil expellers and oil seed crushers, and some samples of black pigments are shown by J. H. Lummerzheim and Co., of Ghent.

An Important New Leprosy Drug

A DECIDED advance towards a solution of the problem of treating leprosy complicated by the presence of a positive Wassermann reaction, is achieved by the introduction of "Avenyl" (2-myristoxymercuri-3-hydroxybenzaldehyde), a preparation which is the outcome of original work in the Wellcome Chemical Research Laboratories. As the result of tests carried out under the Indian Research Fund Association and extending over two years a clinical report covering 30 cases has been issued. These cases lead to the conclusion that "Avenyl" is a most safe and effective remedy in the treatment of leprosy when the Wassermann reaction is positive. Hydnocarpus oil, acknowledged as one of the most important drugs in the treatment of leprosy, is used as the vehicle for this preparation of mercury and probably contributes to the favourable results. The dangerous effects of the use of arsenical compounds in leprosy complicated by syphilis are avoided by the use of "Avenyl." Hydnocarpus oil given alone for prolonged periods had failed to render the Wassermann reaction negative in this type of case. "Avenyl" administration in the series of 30 Wassermann-positive cases of leprosy produced a marked beneficial effect, in that more than 50 per cent., after treatment, gave a negative Wassermann reaction. Ten of these were only given one course of 15 injections, and only one case required four such courses to produce the same effect. Where "Avenyl" treatment did not alter the Wassermann reaction, courses of arsenical preparations, subsequently administered, also failed. "Avenyl" produced general improvement in the lesions manifested in cases of leprosy complicated by a Wassermann-positive reaction. "Avenyl" is non-toxic, is administered with ease by subcutaneous injection, and is issued ready for use as "Hypoloid" "Avenyl" in hermetically sealed phials of 10 c.c. by Burroughs, Wellcome and Co.

International Superphosphate Association

WITH its first meeting, which occupied three days at Hamburg early in June, the International Superphosphate Association may now be regarded as established. An attempt to construct an association in 1922 failed after a conference of the manufacturers of seven countries in Paris. In 1926 European conditions were more stable, and in June a second conference was held in Paris. This was followed by the London conference in October, at which 14 countries were represented, and finally by the present first general meeting of the new Association at Hamburg. The countries represented at the meeting were Belgium, Denmark, Germany, England, Finland, France, Holland, Yugoslavia, North Africa (*i.e.*, Algiers, Tunis, and Morocco), Norway, Austria, Poland, Sweden, Switzerland, Spain, South Africa, Czechoslovakia, and Hungary. In addition the United States makers have declared their willingness to become members.

The Association has been organised, according to a correspondent of the *Financial News*, with the idea of better defending itself from the competition of rival fertilisers and in the hope of solving its problem of regional overproduction by stimulating an improved demand for its products. There is nothing about the new International Association that ranks it with an ordinary cartel, and it is suggested that if any attempt were made to regulate prices or markets, at least for the present, it would probably result in the breaking away of members. It aims at improving and mobilising research facilities, and at discovering and employing the most successful means of propaganda. An experimental station is being opened in Hamburg, as well as a bureau for the exchange of manufacturing information, and technical advisers are being enlisted in the task of presenting to the public the essential qualities of superphosphates.

"C.A." Queries

We receive so many inquiries from readers as to technical, industrial, and other points, that we have decided to make a selection for publication. In cases where the answers are of general interest, they will be published; in others, the answers will simply be passed on to the inquirers. Readers are invited to supply information on the subjects of the queries :—

55 (*Rare Earth Pastilles*).—"Is there a chemical handbook dealing with the manufacture of rare earth pastilles or lime pastilles? I have so many pieces of pastilles by me that I wish to use these up. If you cannot mention a book can you oblige by giving me the names of one or two British manufacturers of pastilles?"

56 (*Luminous Paints*).—"Do you know of any formulæ on the 'home' market for the manufacture of 'luminous paints and colours'; or if ready-made luminous paints are obtainable?"

Replies

54 (*Rust Solvent—June 11*).—Mr. J. C. Vredenburg, 2 and 3, Charterhouse Square, London, writes: Your issue of June 11 contains an inquiry No. 54 concerning rust solvent. Such a product is being produced by the Austrian 'Skida' laboratories and I have just undertaken its introduction into this country. It is marketed as 'Ferrocleanol I.' The substance will be available both in liquid form and as a paste—the former for small objects and the latter for such objects as machinery, railway stock, ships, etc.

Ammonium Sulphate Production in South Africa

THE production of ammonium sulphate in the Union of South Africa during 1926 aggregated 1,004 tons, all of which was produced in the province of Natal. In fact, 81 per cent. was produced by one company—namely, The Dundee Coal Co., Ltd., situated at Waschbank. During 1926 a plant was installed for neutralising the sulphate produced. The company reports that it exported to Mauritius 320 tons out of its total production of 914 tons. The plant, which had been in operation since April, 1922, has 50 coke ovens.

From Week to Week

PRODUCERS OF PHOSPHATE in French North Africa are said to be moving towards the formation of a cartel.

DR. A. JAQUES, F.I.C., has been appointed manager of the By-Product Department of the Shotts Iron Co., Ltd.

THE UNITED ALKALI RECREATION CLUB held its first sports meeting in Widnes, on Saturday, June 4. The prizes were presented by Miss Muspratt.

SIR OLIVER LODGE will preside at the past and present students, dinner to be held on Wednesday, June 22, in connection with the University College centenary celebrations.

CRUSHED BETWEEN A CRANE AND A TUB while working at the Synthetic Ammonia and Nitrate Co.'s works at Billingham, George Atkinson, craneman, of Middlesbrough, has died in the North Ormesby Hospital.

THE I.G. FARBENINDUSTRIE have purchased some American property, and incorporation papers have been filed in the State of Louisiana, U.S.A., with a view to the erection of works at Monroe, La., in the natural gas area.

DR. G. C. CLAYTON took part in the recent debate in the House of Commons on the question of ratification of the Washington Convention for a 48-hour week. He was of opinion that there would be no advantage to the country or to the working classes by ratification.

RECENT WILLS INCLUDE :—Mr. James Kenwyn Macfarlane, of Bothwell, N.B., for some time manager of the Lanarkshire Steel Co., Ltd., £15,603.—Mr. Jesse Sanders Brown, of Bexley Heath, lately a director of G. A. Harvey and Co. (London), Ltd., Greenwich Metal Works, £5,953.

THE ANNUAL MEETING of the Institution of Gas Engineers was held in London on Tuesday. Those present at the luncheon included Sir Arthur Duckham, Dr. Lander, Sir Alexander Gibb, Professor A. Smithells, Professor J. W. Cobb, Mr. J. F. Ronca, Professor Hinchley and Dr. E. W. Smith.

BELL'S UNITED ASBESTOS CO., LTD., of Asbestos House, Southwark Street, London, S.E.1, are inviting subscriptions from the preference and ordinary shareholders for 140,000 6½ per cent. cumulative preference shares of £1 each at 21s. per share, and 46,666 (out of the total issue of 56,468) ordinary shares of £1 each at 27s. 6d. per share.

A NEW SCIENCE SCHOOL has been erected at Clifton College, and was formally opened by the Prince of Wales on Thursday, June 2. Accommodation is provided for the teaching of chemistry, physics, and biology. In the development of the teaching of natural science in schools, Clifton College has always played a very important part, having had on its staff such eminent chemists as Tilden and Shenstone.

THE I.G. FARBENINDUSTRIE has signed an agreement with the Deutschen Luft Hansa aeroplane service under which it engages to guarantee each year a minimum amount of freight by aeroplanes in return for specially favourable rates. This is the first case of a leading German firm contracting for a large amount of aerial freight over an extended period, but products of the I.G. include sera, where speedy transport is essential. This example is likely to be followed by other leading concerns.

SPIRITS OF WINE WORTH £2,000 was stated to have been lost by Stevenson and Howell, Ltd., manufacturing chemists, London, in the past 18 months, during the hearing of charges of theft against George Russell, William Jones, and Henry Charles Farren. It was stated that Russell periodically took a turn as week-end watchman, and during these times he and Jones stole spirit and put it in Farren's car, who drove away with it. Russell and Jones were sentenced to six months on each charge, and Farren to two months in the second division.

THE "VICKERS' NEWS" for June, a well illustrated and finely printed production, contains among many other articles of interest an article on the Research Work of the Vickers' Group, which was established in 1926. This deals with the Sheffield Department which carries on work that is almost entirely metallurgical, the Erith works department, with which is combined the General Laboratory for the study of heat treatment processes and the Dartford works department, which is concerned with the low temperature distillation of coals and the creating of oils.

APPLICATIONS ARE INVITED FOR the following appointments :—Assistant to the Public Analyst of the Metropolitan Borough of Stepney. The Town Clerk, Municipal Offices, Raine Street, London, E.1. July 4.—Professor of Technological Chemistry in the University of Manchester and Municipal College of Technology. The Registrar, College of Technology, Manchester. June 28.—A Biochemist at the National Institute for Research in Dairying. University of Reading, Shinfield, near Reading. The Secretary.—An Assistant Professor of Metallurgy in the University College of Swansea. The Registrar. July 2.—A Biochemist for the East Malling Research Station, near Maidstone, Kent. The Secretary. June 30.

THE NEW NAME of the American Cellulose and Manufacturing Co., Ltd., is "The Celanese Corporation of America."

PROFESSOR W. RAMSDEN has accepted the position of honorary consulting biochemist of the Cancer Hospital, Myrtle Street, Liverpool.

THE CASELLA WORKS OF THE I.G., at Mainkur, were recently the scene of a fire, of unknown origin, in which five tons of dyestuffs were destroyed.

NEGOTIATIONS ARE IN PROGRESS for the erection by the I.G. of an artificial silk factory in Russia. The Germans will supply patents and technical help, and will participate in the profits.

MR. R. GILL, on joining the staff of the International Paint Co., at Felling, has resigned from the position of biochemist at the Dove Marine Laboratory of Armstrong College, at Cullercoats.

MR. G. L. PESKETT, M.A., demonstrator in biochemistry in the University of Oxford, has been awarded a Rockefeller Foundation Fellowship tenable in the United States during the academic year 1927-28.

FERTILISERS, GLUES, SHEEP DIPS AND DISINFECTANTS, as well as starch, blue, and polishes, are dealt with in Preliminary Report No. 15 of the Third Census of Production (1924), given in the *Board of Trade Journal* for June 16.

A FIRE WHICH BROKE OUT at the Illgerm Chemical Co.'s Works, Cleckheaton, on June 8, started in a carbolic still and overflowing burning oil ran several yards into adjoining wire mills. Several minor explosions occurred and it was three hours before the fire brigades were able to get the fire under control.

SIR DANIEL HALL, F.R.S., has retired from the post of Director-General of the Intelligence Department of the Ministry of Agriculture, which he has held since 1920, and which will now lapse. Sir Daniel will continue to act as chief scientific adviser and chairman of the research council of the Ministry.

JOHN BYCROFT, a commercial traveller, of Laindon Road, Billericay, was sentenced at Billericay Petty Sessions on June 8 to four months' hard labour on three charges of embezzling and stealing money alleged to have been received by him on behalf of his former employers, Osmond and Sons, manufacturing agricultural chemists, of Grimsby.

THE BURMAH OIL CO. has offered £100,000 towards the establishment of a college of mining and engineering in the new University of Burma. At the annual meeting of the company, held recently in Glasgow, it was suggested by one of the shareholders, Sir F. C. Gardiner, that something might be done towards the establishment of a chair of chemistry in the University.

THE PRIME MINISTER has consented formally to open the new laboratories of the Birmingham University at Edgbaston on October 20. The building consists of laboratories and departmental accommodation for the three biological departments—namely, the Department of Brewing and Bio-Chemistry of the Fermentation Industries, Zoology, and Botany. The present laboratories at Edmund Street, Birmingham, will be transferred to Edgbaston. The new block with equipments will cost over £100,000. Towards the cost Sir William Waters Butler, brewer and chemist, a member of the University Council, has contributed a sum of about £40,000, and the brewing department in the new block will bear his name. The University will on this occasion confer upon Mr. Baldwin the honorary degree of LL.D. at a special Degree Ceremony to be presided over by the Chancellor of the University (Viscount Cecil of Chelwood).

Obituary

MR. IVOR R. JONES, senior, mineral merchant, of Manchester, on May 23, after a long illness.

Mr. J. J. JACKSON, managing director of Chave and Jackson, manufacturing chemists, Broad Street, Hereford.

MR. GEORGE WILLIAM HARRISON, of Shinfield Road, Reading, on Thursday, June 9. He had carried on business as a manufacturing chemist in Reading for the past 30 or 40 years, the factory now being in Caversham Road.

MR. JOHN HEDLEY, formerly manager of the Muspratt works of the United Alkali Co., at Widnes, on Wednesday, June 8. He joined the works of James Muspratt and Sons in 1878 as letter-carrier, and ultimately became manager, retiring in 1915. He had also acted as Mayor of Widnes.

MR. GEORGE MIDDLETON, an old member of the staff of Forbes, Abbott and Lennard's chemical works, Kingston-by-the-Sea, who was found in apparently fainting condition in a waiting room in Shoreham railway station on Wednesday, June 8. Upon efforts being made to revive him he was found to be dead. It was stated at the inquest that his heart was greatly enlarged, and a verdict of "Death from natural causes" was returned.

DR. MAXIMILIAN KEMPNER, in Amsterdam, on May 11. Dr. Kempner had been closely identified with the potash industry for more than 20 years, and was associated with a great number of large industrial enterprises in Germany and elsewhere. Since 1911 he had been chairman of the board of directors of the German Potash Syndicate. This year, at the age of 73, he undertook a trip to the United States in connection with the distribution of potash there.

References to Current Literature

British

ANALYSIS.—The determination of sulphur dioxide in dried fruit. P. May. *Analyst*, May, pp. 271–273.

APPARATUS.—An improved mercury vapour trap. G. I. Finch. *Nature*, June 11, p. 856.

GENERAL.—Chemical valency. C. D. Niven. *Phil. Mag.*, June, pp. 1,314–1,334.

The "float-and-sink" method of testing small coal: A new laboratory unit. J. L. Thompson and C. N. Kemp. *J.S.C.I.*, June 3, pp. 206–209T.

Kammerlingh Onnes Memorial Lecture. E. Cohen. *J. Chem. Soc.*, May, pp. 1,193–1,209.

ORGANIC.—The iodination of *o*-nitrophenol. H. H. Hodgson. *J. Chem. Soc.*, May, pp. 1,141–1,144.

The dicarbazyls. II. 9 : 9'-Dicarbazyl and its halogen derivatives. J. McLintock and S. H. Tucker. *J. Chem. Soc.*, May, pp. 1,214–1,221.

The structure of normal fructose. Crystalline tetramethyl β-methylfructoside and crystalline tetramethyl fructose (1 : 3 : 4 : 5). W. N. Haworth, E. L. Hirst, and A. Learner. *J. Chem. Soc.*, May, pp. 1,040–1,049.

PHYSICAL.—Homogeneous reactions involving complex molecules. The kinetics of the decomposition of gaseous dimethyl ether. C. N. Hinshelwood and P. J. Askey. *Proc. Roy. Soc. A*, June 1, pp. 215–226.

Electrical osmosis. E. Ambrose. *J. Junior Inst. Engineers*, June, pp. 458–466.

An experimental test of the dipole theory of adsorption. W. G. Palmer. *Proc. Roy. Soc. A*, June 1, pp. 227–236.

United States

APPARATUS.—An all-glass distilling tube without constriction. H. J. Lucas. *Ind. Eng. Chem.*, June 1, p. 680.

Filtration equipment in to-day's industry. H. J. Runyon. *Ind. Eng. Chem.*, June 1, pp. 681–685.

Effectiveness of laboratory rectifying columns. M. J. Marshall and B. P. Sutherland. *Ind. Eng. Chem.*, June 1, pp. 735–738.

COLLOIDS.—Adsorption of vapours by ferric hydroxide gel. J. H. Perry. *Ind. Eng. Chem.*, June 1, pp. 746–748.

Lability of ferric oxide hydrosols. C. H. Sorum. *Science*, May 20, pp. 498–499.

GENERAL.—The ionisation obtained by bubbling air through various solutions. C. R. Pitts. *J. Phys. Chem.*, May, pp. 693–702.

The chlorides of ruthenium. J. P. Howe. *Science*, May 20, p. 503.

The equilibrium between benzene, hydrogen, and cyclohexane. J. H. Burrows and C. Lucarini. *J. Amer. Chem. Soc.*, May, pp. 1,157–1,161.

Notes on the mechanism of fermentation. F. F. Nord. *Science*, May 13, pp. 474–477.

Para-cymene as a thinner for paints, varnishes, and lacquers. P. H. Groggins. *Chem. Met. Eng.*, May, pp. 291–293.

ORGANIC.—Action of sulphur monochloride on petroleum hydrocarbons. E. Lorand. *Ind. Eng. Chem.*, June 1, pp. 733–735.

The composition of corn wax. R. L. Shriner, F. P. Nabenhauer, and R. J. Anderson. *J. Amer. Chem. Soc.*, May, pp. 1,290–1,294.

Pyrogallolbenzein and some of its derivatives. W. R. Orndorff and Chen Wang. *J. Amer. Chem. Soc.*, May, pp. 1,284–1,289.

PHYSICAL.—The relation of temperature to hydrogen-ion concentration of buffer solutions. A. G. Olsen. *Science*, May 13, pp. 477–478.

Flames of atomic hydrogen. I. Langmuir. *Ind. Eng. Chem.*, June 1, pp. 667–674.

German

ANALYSIS.—New paths in gas-analysis. P. Russfeld. *Z. angew. Chem.*, June 9, pp. 669–672.

A new method for the determination of cobalt. G. Spacu and J. Dick. *Z. anal. Chem.*, Vol. 71 (3 and 4), pp. 97–101.

8-Hydroxyquinoline as an analytical reagent. Determination of magnesium, zinc, and aluminium; separation of aluminium or zinc from the alkaline earths, magnesium and alkali metals, and of magnesium from the alkali metals. F. L. Hahn and K. Vieweg. *Z. anal. Chem.*, Vol. 71 (3 and 4), pp. 122–130.

APPARATUS.—A simplified melting-point apparatus for one or more simultaneous determinations. M. Speter. *Chem.-Zeit.*, June 11, p. 443.

CATALYSIS.—Catalytic reduction of aliphatic oximes in the presence of nickel at room temperature. S. Wassiljew. *Berichte*, May 11, pp. 1,122–1,125.

GENERAL.—The contamination of samples by pulverisation in an iron mortar. O. Hackl. *Chem.-Zeit.*, June 11, p. 442.

Ester formation in ethylene glycol. A. Kailan and K. Melkus. *Monatshefte*, May 13, Vol. 48 (1 and 2), pp. 9–35.

ORGANIC.—Synthetic bitter principles from the saccharin-arylsulphonylimide group. A. Klages. *J. prakt. Chem.*, May, Vol. 116 (1 and 2), pp. 163–174.

Metallo-organic syntheses of triphenylamine and triphenylmethane derivatives. W. Madelung, E. Reiss, and E. Herr. *Annalen*, May 14, pp. 1–6.

PHYSICAL.—The change in the electrical conductivity of electrolytes and sols on ageing. N. R. Dhar. *Z. anorg. u. allg. Chem.*, May 13, Vol. 162 (1–3), pp. 237–242.

Equilibrium in binary systems containing cresols as one component. N. A. Puschin and D. Basara. *Monatshefte*, May 13, Vol. 48 (1 and 2), pp. 51–60.

Miscellaneous

ANALYSIS.—The determination of sulphur in pyrites according to the method of Lunge-Berl. Kastner. *Ann. Chim. Analytique*, May 15, pp. 134–136.

Observations on the separation of the alkaloids and especially of morphine in visceral extracts. R. Marcille. *Ann. Chim. Analytique*, May 15, pp. 129–132.

GENERAL.—Special cements. J. Dautrebrande. *Rev. Chim. Ind.*, April, pp. 121–124.

The heat of combustion of calcium cyanamide. N. Kameyama and S. Oka. *Proc. Imp. Acad. Japan*, March, pp. 161–163 (in English).

ORGANIC.—Investigations on cork. F. Zetzsche and G. Rosenthal. *Helv. Chim. Acta*, May 2, Vol. 10 (3), pp. 346–374.

The action of sodium hypochlorite on acid amides. IV. J. Rinkes. *Rec. Trav. Chim. Pays-Bas*, May 15, pp. 268–277.

The pungent principles of ginger. IV. Synthesis of shogaol. H. Nomura and S. Tsurumi. *Proc. Imp. Acad. Japan*, March, pp. 159–160 (in English).

Studies of derivatives of furfural. IV. Some nitro-derivatives of the furylethylene series. J. Kasiwagi. *Bull. Chem. Soc. Japan*, April, pp. 110–113 (in French).

The preparation of ethoxalic acid and ethoxalyl chloride. E. Fourneau and S. Sabetay. *Bull. Soc. Chim.*, April, pp. 537–540.

PHYSICAL.—The rotatory power of the tartaric ion. E. Darmois. *Comptes Rend.*, May 23, pp. 1239–1241.

The calculation of ionic equilibria. P. M. Vèzes. *Comptes Rend.*, May 23, pp. 1246–1247.

Viscosity and geometrical isomerism. G. Cauquil. *Comptes Rend.*, May 23, pp. 1248–1250.

Vapour pressure measurements of aqueous hydrocyanic acid at 18°. M. Shirado. *Bull. Chem. Soc. Japan*, April, pp. 85–95 (in German).

Viscosities of ethyl ether, acetone, and methyl alcohol at low temperatures. S. Mitsukuri and T. Tonomura. *Proc. Imp. Acad. Japan*, March, pp. 155–158 (in English).

SOLUBILITY.—The solubility of naphthalene in benzene, toluene, and xylene. P. Schläpfer and R. Flachs. *Helv. Chim. Acta*, May 2, Vol. X (3), pp. 381–386.

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

270,433. Condensation Products of Croton-aldehyde, Process of Manufacture of. W. Carpmael, London. From I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, February 15, 1926.

The products are obtained by condensing croton aldehyde with an aromatic amine without the addition of an acid condensing agent. The omission of the latter simplifies the method of working and also obviates the removal of the condensing agent from the product. In an example, aniline is gradually added to croton aldehyde at a temperature below 50° C., and the mixture is stirred for three hours and then allowed to stand. It is finally heated in vacuo to 125° C. The residue is a brittle resin.

270,446. Azo Dyes, and Process of Dyeing. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester, J. Baddiley, P. Chorley, and R. Brightman, Crumpsall Vale Chemical Works, Blackley, Manchester. Application dates, February 24 and April 8, 1926.

These dyestuffs are obtained by combining 8 : 8¹-dihydroxy-2 : 2¹-dinaphthylamine-6 : 6¹-disulphonic acid or 8 : 8¹-dihydroxy-2 : 2¹-dinaphthylamine-3 : 6 : 3¹ : 6¹-tetrasulphonic acid with diazo compounds. The coupling may be carried out in a medium acidified with mineral acid or an organic acid, or in an alkaline medium. The sulphonic acid may be combined with one or more molecules of a single diazo compound or of different diazo compounds. All diazo compounds may be used except those made from aminonaphthols and their derivatives. Some of the colours may be diazotised on the fibre and developed in the usual manner. Some are capable of being developed on the fibre with diazo compounds. In an example, meta-amino-benzoic acid is diazotised in the usual manner, and the solution added to the sodium salt of 8 : 8¹-dihydroxy-2 : 2¹-dinaphthylamine-6 : 6¹-disulphonic acid containing sufficient sodium carbonate to maintain the coupling mixture alkaline. The mixture is heated, and the dyestuff isolated by adding salt. It gives a brown shade on viscose silk. A number of examples are given in which other diazo compounds are used, and all the dyestuffs are suitable for dyeing viscose silk.

270,505. Activated Carbon, Manufacture of. R. Threlfall, Oakhurst, Church Road, Edgbaston, Birmingham. Application date, June 4, 1926.

It has been found that charcoal acquires increased absorbing properties after exposure to the vapour of sulphur, or gas adapted to yield sulphur, at a high temperature for a sufficient time. The charcoal is contaminated by sulphur, and this is removed by allowing it to remain in an atmosphere free from sulphur at a temperature above the boiling point of sulphur, *e.g.*, 900° C. The activated charcoal may be ground, washed with hydrochloric or sulphuric acid, with or without hydrofluoric acid, and then with water, and dried at 300° C. The sulphur content may be still further diminished by heating in hydrogen to 850°–900° C. It has been found that good results are obtained by heating peat charcoal in sulphur vapour to 950° C. for 9 hours. During the process carbon bisulphide is produced, but the production is stopped when the desired activation of the carbon is obtained.

270,514. Preventing the Evaporation and Oxidation of Heated Electrolytes, Method of. A. L. Mond, London. From F. Warlimont, 6, Alsterufer, Hamburg, Germany. Application date, June 22, 1926.

In the electrolytic production or recovery of tin, using alkaline electrolytes such as sodium sulphide, the electrolysis is carried out above 90° C., which causes rapid evaporation and oxidation of the electrolyte. This is prevented by covering the electrolyte with unsaponifiable preferably saturated substances which are liquid at, and have a boiling point considerably higher than 80°–110° C., such as paraffin wax. This protects the surface from evaporation and oxidation.

270,559. Barium Salts, especially the Carbonate, Process for Manufacturing Free from Sulphur. F. Falco, Haspe, Westfalen, Germany. Application date, October 5, 1926.

Barium salts are usually obtained from barium sulphide, and are contaminated with sulphur compounds which are difficult to remove. It has been found that a small proportion of a reducing agent such as formaldehyde, oxalic acid, formic acid or hydrazine is capable of converting the sulphur compounds into sulphide or sulphate. These are decomposed by the addition of acids or by the reducing agent itself if this is acid, and the sulphur is evolved as sulphuretted hydrogen or sulphur dioxide. The reducing agents employed can be decomposed and volatilised at higher temperatures, so that subsequent washing is unnecessary. Oxalic acid is particularly suitable for use in the purification of barium carbonate, since the sulphur compounds formed are decomposed with the formation of barium oxalate, which is converted at higher temperatures into barium carbonate with liberation of carbon dioxide. A solution of oxalic acid is preferably used instead of direct addition of the oxalic acid to the precipitation mass, and this may be used as the covering liquid in suction or centrifugal filters. If the reaction products are immediately drawn off, the reversal of the reaction is prevented. In an example, barium carbonate containing 50 per cent. water is treated with a 2 per cent. solution of oxalic acid. The mixture is dried and heated in a rotary drum to expel volatile compounds of sulphur and decompose the oxalate. The barium carbonate obtained contains 99·6 per cent. $BaCO_3$. In another example, barium sulphate obtained by precipitation of barium chloride or barium sulphite solutions is treated with a small proportion of oxalic acid solution. Sulphuretted hydrogen and sulphur dioxide are evolved, and the barium sulphate which was previously slightly coloured becomes pure white.

270,612. Dehydrating Ethyl Alcohol, Process of. Dr. W. Merck, Dr. K. Merck, L. Merck, W. Merck, and Dr. F. Merck, Darmstadt, Germany. International Convention date, October 30, 1926.

Ethyl alcohol can be completely dehydrated by adding quicklime to the 94 per cent. alcohol, boiling with reflux at normal pressure, or by passing the alcohol vapour over the quicklime at normal pressure. It has now been found that the process of dehydration can be accelerated if the 94 per cent. alcohol is heated with quicklime in an autoclave to 116° C. at a pressure of 2·5 atmospheres. Alcohol of 99·9 strength can be obtained after one hour.

270,778. Anthraquinone Intermediates, Manufacture of. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester, A. Shepherdson, W. W. Tatum, and H. M. Bunbury, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, January 11, 1926.

Acylated derivatives of 1 : 4-diaminoanthraquinone are obtained in one operation by the action of acylating agents upon leuco-1 : 4-diaminoanthraquinone in presence of nitrobenzene or nitrotoluene; the nitro compound oxidises the leuco compound simultaneously with the acylation process. Examples are given of the production of 1 : 4-dibenzoyldiaminoanthraquinone by using benzoyl chloride as the acylating agent, 1-amino-4-benzoylamino-anthraquinone by using benzoic anhydride, and 1 : 4-diamino-anthraquinone dioxamic acid by using oxalic acid. The leuco 1 : 4-diaminoanthraquinone may be obtained by the process of Specification 268,891 (see The Chemical Age, Vol. XVI, p. 486).

270,779. Anthraquinone Intermediates, Manufacture of. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester, and W. W. Tatum, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, January 11, 1926.

1 : 4-Diaminoanthraquinone and its derivatives are prepared by oxidising the leuco compounds, in the form of their

(*Continued on page* 579)

(*Continued from page* 578)

salts, in an organic solvent, which may itself serve as the oxidising agent. The reaction proceeds more smoothly than when the free bases are employed. Examples are given of the production of the following compounds by heating the hydrochlorides of their leuco compounds in nitrobenzene: 1-4-diaminoanthraquinone, 1 : 4-dimethyldiaminoanthraquinone, 5-hydroxy- and 5 : 6-dihydroxy 1 : 4-dimethyldiaminoanthraquinone, 5-hydroxy-8-amino-1 : 4-dimethyldiaminoanthraquinone; the latter compound dyes cellulose acetate in greenish-blue shades from an aqueous suspension.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 246,142 (M. Buchner), relating to a cyclic process of producing salts of organic compounds, see Vol. XIV, p. 311; 248,726 (Bakelite Ges.), relating to phenol-aldehyde condensation products, see Vol. XIV, p. 506; 251,294 (I.G. Farbenindustrie Akt.-Ges.), relating to water-soluble condensation products, see Vol. XV, p. 59; 257,885 (Anode Rubber Co., Ltd.), relating to homogeneous deposits from rubber latex, see Vol. XV, p. 475; 258,854 (Soc. of Chemical Industry in Basle), relating to dyestuffs, see Vol. XV, p. 528; 262,120 (I.G. Farbenindustrie Akt.-Ges.), relating to catalytic dehydrogenations, see Vol. XVI, p. 167; 264,124 (Carbide and Carbon Chemical Corporation), relating to glycols, see Vol. XVI, p. 285.

International Specifications not yet Accepted

268,807. DYES AND INTERMEDIATE PRODUCTS. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, March 31, 1926.

Diazo compounds are coupled with 1-aminoaryl-5-pyrazolones in which the 3-position is substituted by methyl, carboxylic, or carboxylic ester groups, and one of the hydrogen atoms of the amino group is substituted by a carboxylic ester group, *e.g.*,—$COOC_2H_5$ or —$CH_2.COOC_2H_5$ the remaining hydrogen atom of the amino group being optionally replaced by an alkyl, aryl, or aralkyl group. The pyrazolones are obtained by treating the corresponding aminoaryl-pyrazolones with chlorformic, chloracetic, or similar esters. Examples are given of the coupling of 1 : 4′-ethyl-carboxyamino-phenyl-3-methyl-5-pyrazolone with diazotised *o*-aniline-sulphonic acid, and 1-phenyl-3-methyl-5-pyrazolone-4′-glycine ethyl ester with diazotised sulphanilic acid.

268,817. ALKALI BISULPHATES. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, April 1, 1926.

Chlorides are treated with sulphuric acid to produce bisulphates in a cast iron or ferrosilicon drum heated electrically by resistances which may be formed of the material of the drum, or by strips of iron or resistance alloy insulated by enamel or asbestos pulp.

269,164. METAL OXIDES AND SALTS. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, April 9, 1926.

Ammoniacal solutions containing copper, silver, nickel, cobalt, or zinc, are treated with carbon monoxide, hydrogen, or water gas to precipitate the metal, or an oxide or basic salts. Successive metals may be precipitated by varying the pressure and temperature.

269,166. HYDROCYANIC ACID. I. G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, April 10, 1926.

Specification 261,559 (see THE CHEMICAL AGE, Vol. XV, p. 620) describes the production of hydrocyanic acid from formamide and/or ammonium formate by heating rapidly above 350° C., preferably to 400°–900° C. and then rapidly cooling. In this invention, the vapour is greatly diluted and passed at high velocity over iron, manganese, nickel, aluminium, or copper in the form of granules or turnings. Other substances which are not dehydrating catalysts may be present. A tube of Krupp's V2A steel is suitable, with a temperature of 350°–450° C. Nickel requires a temperature of 450°–500° C. and aluminium 500°–600° C.

269,174. ALUMINIUM SULPHATE AND ALUMS. R. Jacobsen, Kageröd, Sweden. International Convention date, April 6, 1926.

These are produced by treating aluminous materials such as clay, bauxite, or aluminium silicates, with sulphuric acid, or an acid sulphate of sodium, potassium, or ammonium, in an autoclave under pressure. The temperature is preferably above 185° C., and the solution is separated from insoluble matter at a temperature above 120° C. The process can be rendered continuous by continuously supplying the aluminous material, in the form of a silt, and the acid, and drawing off the solution to a settling tank. The materials may be pre-treated with an acid to expel carbon dioxide and sulphuretted hydrogen.

269,199. PHOSPHATES. Preparation Industrielle des Combustibles, 23, Boulevarde de Strasburg, Nogent-sur-Marne, France, and A. Hoffmann, 37, Boulevarde Ney, Paris. International Convention date, April 8, 1926.

To the filtered solution obtained by treating natural phosphate with excess of hydrochloric acid, is added a large proportion of a soluble chloride such as sylvinite. Calcium chloride is then removed by crystallisation, and the excess of acid recovered by distillation. From the residual solutions sodium phosphate, potassium phosphate, and monocalcium phosphate can be crystallised.

269,209. AGGLOMERATING POWDERED SUBSTANCES. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, April 10, 1926.

Drops of water or a salt solution are allowed to fall on to the surface of a uniform layer of the powdered substance, and the spherical pieces produced are separated from the excess powder and dried. Uniform pieces suitable for reaction with gases are thus produced.

269,212. DIAZO SALTS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany.

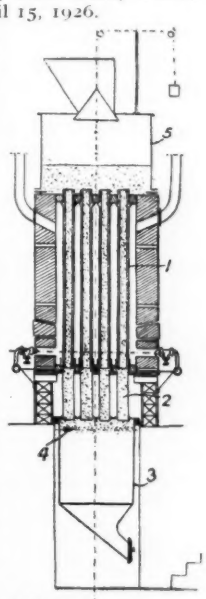
Strongly acid solutions of diazotised amines are caused to react with metal salts of 1 : 5-naphthalene-disulphonic acid, or weakly acid diazo solutions are caused to react with the free 1 : 5-naphthalene disulphonic acid. The products are acid 1 : 5-naphthalenedisulphonic acid diazonium salts which are suitable for use in the production of azo dyes on the fibre. When mixed dry with a base such as magnesium or zinc oxide, calcium hydroxide, or alkali carbonate, they give preparations which dissolve to neutral solutions. The preparation of diazonium salts from 5-nitro-2-aminoanisole and 3-nitro-4-aminotoluene is described.

269,469. REACTIVATING PURIFYING AGENTS. Darco Sales Corporation, 45, East 42nd Street, New York, U.S.A. International Convention date, April 15, 1926.

Active carbon and other purifying agents for liquids are reactivated in a wet or pasty state by treatment with a gas such as chlorine or sulphur dioxide.

269,477. ACTIVE CARBON. Soc. de Recherches et d'Exploitations Petrolifères, 75, Boulevarde Haussmann, Paris. International Convention date, April 15, 1926.

This is produced by treating carbonaceous materials with activating gases at high temperatures in vessels or chambers having slightly permeable walls through which the said gases pass in order to reach the material. The activating gases may contain steam, carbon dioxide, chlorine, oxygen, etc. In the form of apparatus shown the carbonaceous material is fed from a hopper 5 down porous tubes 1 arranged in a gas heated furnace; it is removed though the discharge hopper 3 after cooling in the metal tubes 2; combustible gases generated inside the tubes are removed through the hopper 5. Other forms of apparatus for attaining the same end are described.



269,477

269,498. SALTS OF ALKALOIDS. Chemische Fabrik Auf Actien vorm. E. Schering, 170, Mullerstrasse, Berlin. International Convention date, April 15, 1926.

The alkaloids which have a paralysing effect upon the vagus nerve are converted into camphorates by the known methods

—*e.g.*, by interaction of the acid and base in an organic solvent. The acid camphorate is always produced, even when the alkaloid is in excess. Examples are given in which hyoscyamine and atropine are converted into their respective camphorates.

LATEST NOTIFICATIONS.

271,805. Process and installation for eliminating sulphuretted hydrogen from gases. Still, C. [Firm of]. May 25, 1926.

271,818. Processes of manufacturing vanillin. Bots, R. H., and Soc. Anon. Produits Chimiques Coverlin. May 25, 1926.

271,828. Process for concentrating raw pyroligneous acid. Holzverkohlungs-Industrie Akt.-Ges. May 25, 1926.

271,837. Manufacture of new readily soluble organic salts of C.-C.-dialkyl and arylalkyl barbituric acids. Etablissements Poulenc Frères. May 25, 1926.

271,849. Catalysts for synthetic methanol production. Commercial Solvents Corporation. May 26, 1926.

271,852. Means for the extraction of carbon dioxide from gaseous mixtures. I. G. Farbenindustrie Akt.-Ges. May 28, 1926.

271,858. Internal-combustion engines operated with pulverulent fuels. I. G. Farbenindustrie Akt.-Ges. May 31, 1926.

271,863. Process for preserving rubber latex. I. G. Farbenindustrie Akt.-Ges. May 28, 1926.

271,877. Roasting of zinc sulphide ores. Soc. Générale Métallurgique de Hoboken. May 27, 1926.

271,884. Manufacture of α-anthraquinonyl ketones. I. G. Farbenindustrie Akt.-Ges. May 25, 1926.

271,897. Process for producing fast tints on vegetable fibres and manufacture of dyestuffs therefor. Soc. of Chemical Industry in Basle. May 27, 1926.

271,898. Manufacture of new products applicable for making dyestuff preparations and of new dyestuff preparations made therewith. Soc. of Chemical Industry in Basle. May 29, 1926.

271,906. Manufacture of vat dyestuffs. I. G. Farbenindustrie Akt.-Ges. May 29, 1926.

272,155. Process of and apparatus for the manufacture of formaldehyde. Soc. Chimique de la Grande-Paroisse, Azote et Produits Chimiques. June 3, 1926.

272,173. Drying-agent for gases. I. G. Farbenindustrie Akt.-Ges. June 7, 1926.

272,190. Manufacture and production of valuable products from coal, tars, mineral oils, and the like. I. G. Farbenindustrie Akt.-Ges. June 1, 1926.

272,194. Manufacture and production of more valuable products from coal suspensions, tars, mineral oils, and the like. I. G. Farbenindustrie Akt.-Ges. June 1, 1926.

272,198. Manufacture of hydroxy acids. Stiepel, Dr. C. June 4, 1926.

272,211. Apparatus for the purification of impure solutions of caustic soda or the like on osmotic principles. Cerini, L. June 1, 1926.

272,225. Manufacture of α-anthraquinonyl ketones. I. G. Farbenindustrie Akt-Ges. June 7, 1926.

Specifications Accepted with Date of Application

240,185. Calcining limestone in vertical kilns, Process of. Hauts-Fourneaux and Acieries de Differdange St. Ingbert-Rumelange Soc. Anon., and E. Lavandier. January 21, 1925.

248,012. Furnaces for smelting iron, steel, and other metals. P. Kühn. February 23, 1925.

248,782. Water-soluble condensation products, Manufacture of. I. G. Farbenindustrie Akt.-Ges. March 9, 1925.

248,791. α-Keto-β naphthols and condensation products of the benzanthrone series, Manufacture of. I. G. Farbenindustrie Akt.-Ges. March 9, 1925.

249,101. Condensation products from urea or its derivatives and formaldehyde, Manufacture of. Soc. of Chemical Industry in Basle. March 10, 1925.

253,488. Azo dyestuffs, Manufacture of. I. G. Farbenindustrie Akt.-Ges. June 9, 1925.

257,900. New compounds of gall acids, Manufacture of. Soc. of Chemical Industry in Basle. September 2, 1925.

259,961. β-Pyridylhydrazine and its derivatives, Process for production of. Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler. October 17, 1925.

262,397. Sulphuric acid, Production of. Metallbank und Metallurgische Ges., Akt.-Ges. December 7, 1925.

268,309. Discharging ammonium sulphate from saturating tanks, Method of. Collin Akt.-Ges. zur Verwertung von Brennstoffen und Metallen. March 24, 1926.

271,533. Dyes and dyeing. B. Wylam, J. G. Harris, J. Thomas, and Scottish Dyes, Ltd. January 21, 1926.

271,537. Dyes and dyeing. W. Smith, J. Thomas, and Scottish Dyes, Ltd. January 26, 1926.

271,550. Dyeing cellulose esters and preparations for use therein. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*) February 22, 1926.

271,564. Adsorbents, Manufacture and production of. J. Y. Johnson. (*I. G. Farbenindustrie Akt.-Ges.*) February 25, 1926.

271,569. Process for reducing vat dyestuffs to their leuco-derivatives. C. H. Marchalk. February 26, 1926.

271,580. Water-insoluble colours or dyes. F. C. R. Marks. (*E. I. Du Pont De Nemours and Co.*) March 2, 1926.

271,589. Acetic acid and acetates, Manufacture of. Synthetic Ammonia and Nitrates, Ltd., Smith, P. A., and Smith, H. G. March 13, 1926.

271,601. Treatment of mineral oils to obtain lower boiling oils. W. J. Perelis. March 24, 1926.

271,602. Anthraquinone derivatives, Manufacture of. British Dyestuffs Corporation, Ltd., and A. Shepherdson. March 27, 1926.

271,606. Heat-treatment of steel. N. D. Chopra and F. J. Bullen. April 1, 1926.

271,662. Solders for aluminium and its alloys. E. C. R. Marks. (*Vergo Aluminium Metallverwertungs-Ges.*) June 29, 1926.

271,725. Peroxides of organic acids, Methods of making. R. H. McKee. October 26, 1926.

271,740. Distilling solid carbonaceous material, Process of. M. J. Trumble. November 12, 1926.

271,767. Converting methane into hydrocarbons of higher carbon content. Petrole Synthetique and A. Folliet. January 1, 1927. Addition to 261,267.

271,798. Corrosion resistant articles. Aluminium Company of America. January 22, 1927.

271,799. Machines for crushing ores, stone, etc. C. Roscoe. March 29, 1927.

Applications for Patents

Baddiley, J., Brightman, R., British Dyestuffs Corporation, Ltd., and Chorley, P. Dyeing. 15,180. June 7.

Blagden, J. W., and Howards and Sons, Ltd. Manufacture of crystalline menthol. 15,294. June 8.

British Dyestuffs Corporation, Ltd., and Silvester, W.A. Manufacture of dyes. 15,005. June 7.

British Dyestuffs Corporation, Ltd. Manufacture of finely-divided substances. 15,171. June 7.

Carpmael, A., and I. G. Farbenindustrie Akt.-Ges. Manufacture of sulphonic acids. 14,990. June 7.

Carpmael, A., and I. G. Farbenindustrie Akt.-Ges. Manufacture of benzathrone condensation products. 15,425. June 9.

Carpmael, A., and I. G. Farbenindustrie Akt.-Ges. Precipitation of copper. 15,426. June 9.

Carpmael, A., and I. G. Farbenindustrie Akt.-Ges. Manufacture of condensation products of anthraquinone. 15,562. June 10.

Carpmael, A., and I. G. Farbenindustrie Akt.-Ges. Process for protecting wool from insects, etc. 15,569. June 10.

Carpmael, A., and I. G. Farbenindustrie Akt.-Ges. Manufacture of vat dyestuffs of anthraquinone series. 15,631. June 11.

Cerini, L. Apparatus for purification of solutions of caustic soda, etc. 14,560. May 31. (Italy, June 1, 1926.)

Chemical Products Co., and Dicker, S. G. S. Production of ammonium phosphate. 15,566. June 10.

Chemische Fabrik vorm. Sandoz. Treating cellulose fibres with alkali. 15,544. June 10. (Germany, October 29, 1926.)

Coley, H. E. Apparatus for activating carbon, etc. 14,733. June 1.

Coley, H. E. Manufacture of zinc oxide. 14,734. June 1.

Coley, H. E. Manufacture of zinc. 15,041. June 7.

Coley, H. E. Treatment of ores, etc. 15,443. June 9.

Coley, H. E. Manufacture of zinc. 15,444. June 9.

Du Pont de Nemours and Co., E. I., and Marks, E. C. R. Printing with vat dyes. 15,280. June 8.

Etablissements Poulenc Frères, and Fourneau, E. Manufacture of formyl derivatives of 2-oxy-4-amino-phenyl-arsinic acid, etc. 15,197. June 7. (France, October 29, 1926.)

Hooley, L. J., Scottish Dyes, Ltd., and Thomas, J. Production of dyestuffs. 14,748. June 1.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Catalytic production of hydrocarbons. 14,503. May 30.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Production of dyestuffs. 14,504. May 30.

I. G. Farbenindustrie Akt.-Ges. Manufacture of azo dyestuffs. 14,746. June 1.

I. G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of azo dyestuffs. 14,828. June 2.

I. G. Farbenindustrie Akt.-Ges. Manufacture of dyestuffs. 14,534. May 30. (Germany, May 29, 1926.)

I. G. Farbenindustrie Akt.-Ges. Manufacture of α-anthraquinonyl ketones. 14,851. June 2. (Germany, June 7, 1926.)

Imray, O. Y. (I. G. Farbenindustrie Akt.-Ges.). Manufacture of azo-dyestuffs. 14,746. June 1.

Plauson, H., and Potts, H. E. Producing rapidly moving electrons, etc. 14,539. May 30.

Still, C. and Still, C. [Firm of]. Recovering sulphuric acid. 14,641. May 31. (Germany, December 22, 1926.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £34 per ton; powder, £36 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength, and locality.

ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, packages extra, returnable.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 2s. 5d. to 2s. 10d. per gall.; pyridinised industrial, 2s. 7d. to 3s. per gall.; mineralised, 3s. 6d. to 3s. 10d. per gall.; 64 O.P., 1d. extra in all cases; prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3¾d. per lb., ex wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3¼d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton for home market, 1-cwt. drums included.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.r. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—8d. to 9d. per lb. Crude 60's, 2s. 4d. per gall.

ACID CRESYLIC 99/100.—2s. 8d. to 2s. 9d. per gall. 97/99.—2s. 1½d. to 2s. 3d. per gall. Pale, 95%, 2s. to 2s. 2d. per gall. Dark, 1s. 9d. to 1s. 10d. per gall.

ANTHRACENE.—A quality, 2½d. to 3d. per unit. 40%, 3d. per unit.

ANTHRACENE OIL, STRAINED.—8d. to 8½d. per gall. Unstrained, 7½d. to 8d. per gall.; both according to gravity.

BENZOLE.—Crude 65's, 1s. 0¾d. to 1s. 1¾d. per gall., ex works in tank wagons. Standard Motor, 1s. 9d. to 2s. 2d. per gall., ex works in tank wagons. Pure, 1s. 7d to 2s. 6d. per gall., ex works in tank wagons.

TOLUOLE.—90%, 1s. 8d. to 2s. 0d. per gall. Firm. Pure, 1s. 10d. to 2s. 3d. per gall.

XYLOL.—1s. 11d. to 2s. 3d. per gall. Pure, 2s. 6d. per gall.

CREOSOTE.—Cresylic, 20/24%, 10½d. per gall. Standard specification, 6¾d. to 9d.; middle oil, 7½d. to 8d. per gall. Heavy, 8½d. to 9d. per gall. Salty, 7d. per gall. less 1½%.

NAPHTHA.—Crude, 8d. to 9d. per gall. according to quality. Solvent 90/160, 1s. 3d. to 1s. 9d. per gall. Solvent 95/160, 1s. 5d. to 1s. 6d. per gall. Solvent 90/190, 1s. 1½d. to 1s. 4d. per gall.

NAPHTHALENE CRUDE.—Drained Creosote Salts, £7 10s. per ton. Whizzed or hot pressed, £8 10s. to £9 per ton.

NAPHTHALENE.—Crystals, £11 10s. to £13 10s. per ton. Quiet. Flaked, £12 10s. per ton, according to districts.

PITCH.—Medium soft, 70s. to 80s. per ton, according to district; nominal.

PYRIDINE.—90/140, 7s. 6d. to 13s. per gall. Nominal. 90/180, 4s. 6d. to 5s. per gall. Heavy, 5s. to 8s. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 9d. per lb.

ACID GAMMA.—4s. 9d. per lb.

ACID H.—3s. 3d. per lb. 100% basis d/d.

ACID NAPHTHIONIC.—1s. 6d. per lb. 100% basis d/d.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb. 100% basis d/d.

ACID SULPHANILIC.—9d. per lb. 100% basis d/d.

ANILINE OIL.—7½d. per lb. naked at works.

ANILINE SALTS.—7½d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—4¼d. per lb. Fair inquiry.

m-CRESOL 98/100%.—3s. per lb. Only limited inquiry.

p-CRESOL 32/34° C.—2s. 8½d. per lb. Only limited inquiry.

DICHLORANILINE.—2s. 3d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb. d/d. Drums extra.

DINITROBENZENE.—9d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 8d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—11d. to 1s. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb. d/d.

B-NAPHTHYLAMINE.—3s. per lb. d/d.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 9d. per lb. d/d.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb. d/d.

R. SALT.—2s. 2d. per lb. 100% basis d/d.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—7½d. per lb. naked at works.

p-TOLUIDINE.—2s. 2d. per lb. naked at works

m-XYLIDINE ACETATE.—2s. 11d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 10s. to £9 5s. per ton. Grey, £15 10s. per ton. Liquor, 9d. per gall. 32° Tw.

CHARCOAL.—£6 15s. to £10 per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10d. per gall. 16° Tw.

WOOD CREOSOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 9d. to 4s. per gall., 60% O.P. Solvent, 3s. 11d. to 4s. 3d. per gall., 40% O.P.

WOOD TAR.—£4 to £5 10s. per ton and upwards, according to grade

BROWN SUGAR OF LEAD.—£40 15s. to £41 10s. per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 5½d. per lb., according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£3 10s. to £6 15s. per ton, according to quality.

CADMIUM SULPHIDE.—2s. 6d. to 2s. 9d. per lb.

CARBON BISULPHIDE.—£20 to £25 per ton, according to quantity.

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 1d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—5¾d. to 6¼d. per lb.

LAMP BLACK.—£35 per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£22 10s. per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£9 to £11 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£47 10s. to £50 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb. carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. to 6s. 3d. per lb.

ZINC SULPHIDE.—1s. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 5d. to 2s. 6d. per lb.

ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., according to quantity. Solely ex Gum, 1s. to 1s. 3d per oz., according to quantity.

ACID, BORIC B.P.—Crystal, £40 to £43 per ton; powder, £44 to £47 per ton. Carriage paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 7½d. to 1s. 8d. per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d. per lb.
ACID, SALICYLIC, B.P.—1s. 3½d. to 1s. 5d. per lb. Technical.—11¾d. to 1s. per lb.
ACID, TANNIC B.P.—2s. 9d. to 2s. 11d. per lb.
ACID, TARTARIC.—1s. 3¾d. per lb., less 5%. Firm market.
AMIDOL.—9s. per lb., d/d.
ACETANILIDE.—1s. 6d. to 1s. 8d. per lb. for quantities.
AMIDOPYRIN.—8s 6d per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity.
AMMONIUM CARBONATE B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated: lump, 1s. per lb.; powder, 1s. 3d. per lb.
ATROPINE SULPHATE.—11s. per oz. for English make.
BARBITONE.—6s. 6d. per lb.
BENZONAPHTHOL.—3s. 3d. per lb. spot.
BISMUTH CARBONATE.—9s. 9d. to 10s. per lb
BISMUTH CITRATE.—9s. 6d. to 9s. 9d. per lb.
BISMUTH SALICYLATE.—8s. 9d. to 9s. per lb.
BISMUTH SUBNITRATE.—7s. 9d. to 8s. per lb.
BISMUTH NITRATE.—5s. 9d. to 6s. per lb.
BISMUTH OXIDE.—13s. 9d. to 14s. per lb.
BISMUTH SUBCHLORIDE.—11s. 9d. to 12s. per lb.
BISMUTH SUBGALLATE.—7s. 9d. to 8s. per lb. Extra and reduced prices for smaller and larger quantities respectively; Liquor Bismuthi B.P. in W. Qts. 1s. 1d. per lb.; 12 W. Qts. 1s. per lb; 36 W. Qts. 11½d. per lb.
BORAX B.P.—Crystal, £24 to £27 per ton; powder, £26 to £29 per ton, according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Potassium, 1s. 10d. to 1s. 11d. per lb.; sodium, 2s. 1d. to 2s. 2d. per lb.; ammonium, 2s. 3d. to 2s. 4d. per lb., all spot
CALCIUM LACTATE.—1s. 2d. to 1s. 4d.
CHLORAL HYDRATE.—3s. 2d. to 3s. 5d. per lb., duty paid.
CHLOROFORM.—2s. 3d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—Prices for Winchester quarts; dozen Winchester quarts; carboys or drums; and 10 cwt. lots respectively: ·730—1s. 2½d.; 1s. 2d.; 1s. 1½d.; 1s. 0½d.; ·720 technical—1s. 5½d.; 1s. 5d.; 1s 4½d.; 1s 3½d.; ·720 pur. (Aether B.P., 1914)—2s. 4d.; 2s. 3½d.; 2s. 3d.; 2s. 2d.
FORMALDEHYDE.—£39 per ton, in barrels ex wharf.
GUAIACOL CARBONATE.—5s. per lb.
HEXAMINE.—2s. 4d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 1 lb., 16s. per doz.; ½ lb., 9s. 6d. per doz.; ¼ lb., 6s. 6d. per doz.
HYDROQUINONE.—4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 3s. 6d. per lb., for 28-lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
IRON AMMONIUM CITRATE B.P.—2s. 1d. to 2s. 4d. per lb. Green, 2s. 4d. to 2s. 9d. per lb. U.S.P., 2s. 2d. to 2s. 5d. per lb.
IRON PERCHLORIDE.—4d. per lb. to 22s. per cwt., according to quantity.
MAGNESIUM CARBONATE.—Light Commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy Commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb., in 1 cwt. lots.
MENTHOL.—A.B.R. recrystallised B.P., 18s. 3d. per lb. net; Synthetic, 10s. 6d. to 14s. 6d. per lb., according to quantity; Liquid (95%), 12s. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, 7s. 6d. to 7s. 7d. per lb., levig., 7s. to 7s. 1d. per lb.; Corrosive Sublimate, Lump, 5s. 9d. to 5s. 10d. per lb., Powder, 5s. 2d. to 5s. 3d. per lb.; White Precipitate, Lump, 5s. 11d. to 6s. per lb., Powder, 6s. to 6s. 1d. per lb., Extra Fine, 6s. 1d. to 6s. 2d. per lb.; Calomel, 6s. 4d. to 6s. 5d. per lb.; Yellow Oxide, 6s. 10d. to 6s. 11d. per lb.; Persulph., B.P.C., 6s. 1d. to 6s. 2d. per lb.; Sulph. nig., 5s. 10d. to 5s. 11d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 9d. per lb.
METHYL SULPHONAL.—11s. per lb.
METOL.—11s. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—3s. per lb.
PHENAZONE.—4s. 6d. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—100s. per cwt. less 2½% for ton lots.
POTASSIUM CITRATE.—1s. 11d. to 2s. 2d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb. for 1 cwt. lots.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 6d. per lb., spot.
QUININE SULPHATE.—2s. per oz., 1s. 8d. to 1s. 9d. for 1000 oz. lots in 100 oz. tins.
RESORCIN.—4s. per lb., spot.
SACCHARIN.—55s. per lb.; in quantity lower.
SALOL.—2s. 4d. per lb.
SODIUM BENZOATE, B.P.—1s. 10d. to 2s. 2d. per lb.
SODIUM CITRATE, B.P.C., 1911.—1s. 8d. to 1s. 11d. per lb., B.P.C., 1923—2s. to 2s. 1d. per lb. for 1 cwt. lots. U.S.P., 1s. 11d. to 2s. 2d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 5s. per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—90s. to 95s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 9d. to 1s. 10d. per lb. Crystal, 1s. 10d. to 1s. 11d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
SULPHONAL.—7s. 6d. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d to 2s. 3d. per lb.
THYMOL.—Puriss., 10s. 3d. to 10s. 9d. per lb., according to quantity. Firmer. Natural, 12s. 6d. per lb. Cheaper.

Perfumery Chemicals

ACETOPHENONE.—7s. 3d. per lb.
AUBEPINE (EX ANETHOL), 10s. 6d. per lb.
AMYL ACETATE.—2s. per lb.
AMYL BUTYRATE.—5s. 3d. per lb.
AMYL SALICYLATE.—3s. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 6d. per lb.
CINNAMIC ALDEHYDE NATURAL.—17s. per lb.
COUMARIN.—10s. per lb.
CITRONELLOL.—14s. 6d. per lb.
CITRAL.—8s. 9d. per lb.
ETHYL CINNAMATE.—7s. 6d. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—9s. per lb.
GERANIOL (PALMAROSA).—17s. 6d. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—4s. 9d. per lb.
ISO EUGENOL.—13s. 6d. per lb.
LINALOL.—Ex Bois de Rose, 15s. per lb. Ex Shui Oil, 10s. 6d. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 18s. per lb. Ex Shui Oil, 14s. 6d. per lb.
METHYL ANTHRANILATE.—8s. 6d. per lb.
METHYL BENZOATE.—4s. 6d. per lb.
MUSK KETONE.—35s. per lb.
MUSK XYLOL.—8s. 6d. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—10s. 6d. per lb.
PHENYL ETHYL ALCOHOL.—10s. 6d. per lb.
RHODINOL.—32s. 6d. per lb.
SAFROL.—1s. 6d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN.—17s. to 18s. 6d. per lb. Good demand.

Essential Oils

ALMOND OIL.—10s. 3d. per lb.
ANISE OIL.—3s. 1d. per lb.
BERGAMOT OIL.—30s. per lb.
BOURBON GERANIUM OIL.—14s. 9d. per lb
CAMPHOR OIL.—67s. 6d. per cwt.
CANANGA OIL, JAVA.—26s. per lb.
CINNAMON OIL LEAF.—6d. per oz.
CASSIA OIL, 80/85%.—8s. 6d. per lb.
CITRONELLA OIL.—Java, 85/90%, 1s. 11d. per lb. Ceylon, pure, 1s. 9d. per lb.
CLOVE OIL.—6s. per lb.
EUCALYPTUS OIL, 70/75%.—2s. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, Esters, 21s. per lb.
LEMON OIL.—8s. 3d. per lb.
LEMONGRASS OIL.—4s. 6d. per lb
ORANGE OIL, SWEET.—10s. 6d. per lb.
OTTO OF ROSE OIL.—Anatolian, 30s. per oz. Bulgarian, 70s. per oz.
PALMA ROSA OIL.—9s. 9d. per lb.
PEPPERMINT OIL.—Wayne County, 17s. per lb. Japanese, 8s. per lb.
PETITGRAIN OIL.—7s. 6d. per lb.
SANDALWOOD OIL.—Mysore, 26s. 6d. per lb.; 90/95% 16s. 6d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, June 16, 1927.

TRADE has been somewhat quiet during the current week, although the undertone is quite firm and confident. Prices on the whole are unchanged and export demand is fair, but a good deal of the business offering is at unremunerative figures.

General Chemicals

ACETONE continues steady at £61 to £63 per ton; demand moderate.

ACID ACETIC.—Unchanged at recent figures.

ACID CITRIC is without change in value and is quoted at about 1s. 7½d. per lb., less 5 per cent.

ACID FORMIC has been in fair demand at £46 to £48 per ton for 85%.

ACID LACTIC.—Unchanged and firm at £43 per ton for 50% by weight.

ACID OXALIC.—Only a fair business is moving at the current figure of £27 10s. to £28 10s. per ton.

ACID TARTARIC continues firm and unchanged in value at 1s. 6½d. per lb.

ALUMINA SULPHATE is only moderately active at £6 per ton for 17-18%.

AMMONIUM CHLORIDE.—In fair request at £19 per ton.

ARSENIC.—Unchanged.

BARIUM CHLORIDE.—Only a small business is reported and the price continues to be quoted at £8 10s. to £9 per ton.

COPPER SULPHATE.—Demand has slackened somewhat with the approaching finish of the season, and price is very firm at £23 10s. per ton.

CREAM OF TARTAR remains firm and price unchanged at £99 to £101 per ton.

EPSOM SALTS.—Extremely firm and in good request at £5 5s. per ton.

FORMALDEHYDE has been quite a bright spot this week, and the market is very firm at £41 10s. to £43 per ton.

LEAD ACETATE is unchanged at the price of £42 per ton.

LEAD NITRATE.—Firm and unchanged at £38 per ton; demand fair.

METHYL ACETONE.—Fairly active at about £62 per ton.

METHYL ALCOHOL.—Unchanged.

POTASSIUM CHLORATE.—Unchanged at 3¼d. per lb.

POTASSIUM PERMANGANATE passes slowly into consumption at 7½d. to 8d. per lb. for B.P.

POTASSIUM PRUSSIATE is firm and in fair demand at £65 to £67 per ton.

SODIUM ACETATE.—Only in small request, and price is quoted at about £19 per ton.

SODIUM BICHROMATE.—Unchanged at British makers' figures.

SODIUM HYPOSULPHITE.—Unchanged.

SODIUM NITRITE has been in better request at from £19 10s. to £20 per ton.

SODIUM PRUSSIATE still continues firm and is quoted at about 4½d. per lb.

SODIUM SULPHIDE.—Demand has improved and the price is unchanged.

ZINC SULPHATE has been a bright spot at £14 per ton.

Coal Tar Products

The market values of coal tar products show little change from last week, and there is little business passing.

90's BENZOL is plentiful, and is quoted at 1s. 4d. to 1s. 5d. per gallon on rails, while the motor quality is worth about 1s. 3½d. per gallon.

PURE BENZOL is worth about 1s. 8d. to 1s. 9d. per gallon on rails.

CREOSOTE OIL is slightly firmer, and is quoted at 7¼d. to 7½d. per gallon on rails in the North, while the price in London is 8½d. to 8¾d. per gallon.

CRESYLLIC ACID is very steady, the pale quality, 97/99%, being quoted at 2s. per gallon on rails, while the dark quality, 95/97%, is worth about 1s. 10d. per gallon.

SOLVENT NAPHTHA has practically no inquiry, and is worth about 11d. to 1s. per gallon.

HEAVY NAPHTHA is quoted at 11d. per gallon.

NAPHTHALENES.—The 74/76 quality is weaker, and is quoted at £7 to £7 10s. per ton, while the 76/78 quality remains at £8 5s. to £8 15s. per ton.

PITCH.—The market is rather firm; to-day's value is 75s. to 80s. per ton f.o.b. U.K. ports.

Latest Oil Prices

LONDON, June 15.—LINSEED OIL, flat and 7s. 6d. lower. Spot ex-mill, £33 10s.; June, £32 10s.; July-August, £32 12s. 6d.; September-December, £33 2s. 6d. RAPE OIL, inactive. Crude extracted, £43 10s. Technical refined, £45 10s. COTTON OIL, quiet. Refined common edible, £42; Egyptian crude, £36; deodorised, £44. TURPENTINE, slow and 3d. lower. American, spot, 42s.; July-December, 44s.

HULL, June 15.—LINSEED OIL.—Spot to December, £33 12s. 6d. COTTON OIL.—Bombay crude, £35 15s.; Egyptian, crude, £39; edible refined, £38 5s.; deodorised, £41. PALM KERNEL OIL.—Crushed, naked, 5¼ per cent., £37. GROUNDNUT OIL.—Crushed-extracted, £44; deodorised, £48. SOYA OIL.—Extracted and crushed, £34; deodorised, £37 10s. RAPE OIL.—Crude-extracted, £44; refined, £46 per ton, net cash terms, ex mill.

Nitrogen Products

Export.—Large purchases of sulphate of ammonia have been reported. The principal purchasing countries are the Mediterranean and the Far East. Prices appear to be the equivalent of £9 15s. per ton, f.o.b. U.K. port in single bags. As anticipated in our last issue, the large quantities of sulphate available have caused the market to sag a little.

Home.—It is understood that fertiliser manufacturers are now covering their summer and autumn requirements. Prices for these have not yet been arranged. It is anticipated that the British producers' price scale will show a considerable drop on that of last year, but producers are apparently delaying the publication of their price scale as long as possible. Small orders for immediate delivery are reported from various parts of the country.

Nitrate of Soda.—Prices for this commodity remain unchanged, but the large merchants who have been purchasing readily at 16s. 4d.–16s. 9d. per metric quintal now tend to hold off. Apparently they do not wish to cover later requirements until more definite information is available concerning the whole nitrogen position. No fresh news has reached us from Chile concerning the reopening of further oficinas. When the large nitrogen producers on the Continent announce their price scale the position for the coming year will, to some extent, be stabilised. At present we are inclined to the view that dealers have been optimistic concerning nitrate prospects.

Tariff Changes

FRANCE.—The modifications of the French Customs Tariff, consequent on the conclusion of commercial arrangements made last year, and affecting certain classes of textiles and chemicals, are contained in a Law, of January 16 last, of which full particulars are given in the *Board of Trade Journal* for June 2, 1927.

TUNIS.—A recent decree withdraws the prohibition on the export of oil seed and prints from Tunis, with the exception of olives.

IRAQ.—Details of extensive customs tariff amendments are contained in the *Board of Trade Journal* for June 9, 1927. Photographic apparatus, mills and crushers of various kinds, molasses and artificial silks are among articles affected by the changes.

GREECE.—A recent Decree provides that gold drachma is to be converted into paper drachma at the rate of 14 (instead of 10) paper drachma per gold drachma for the purpose of tabulating Customs and other duties on cane and beet sugar, glucose, levulose, and any other similar fermentable substance.

PRODUCTION IN THE FRENCH DYE INDUSTRY, which in 1925 slackened slightly in comparison with 1924, has regained the lost ground. Lyons has four manufacturers making between 25 per cent. and 30 per cent. of the French output. The production of sulphur dyes has remained practically stationary during the last three years. The output of indigo in other French works exceeds the demand, as does also that of sulphur dyes. In 1923 derivatives of diphenylmethane and triphenylmethane were produced in insufficient quantity, with the result that 22 per cent. of the supplies were imported. In 1926 the output of these dyes had so increased that derivatives of triphenylmethane appear among the leading exports. While 75 per cent. of the indophenols, oxazines and thiazines were imported in 1923, the output is now practically sufficient. There remain only vat dyes, other than indigo, of which none are now produced in France, but manufacture will begin in 1927.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, June 15, 1927.

THE heavy chemical market has been quieter during the past week, what inquiry there has been being for very moderate quantities. There are no changes in prices of any importance to record.

Industrial Chemicals

ACID ACETIC.—98/100%, £55 to £67 per ton, according to quantity and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystal, granulated or small flakes, £34 per ton; powder, £36 per ton, packed in bags, carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Rather easier and now quoted 8¼d. per lb., f.o.b. U.K. ports.

ACID CITRIC B.P. CRYSTALS.—In moderate demand and price unchanged at about 1s. 6¼d. per lb., less 5% ex store. Continental material higher at about 1s. 7d. per lb., c.i.f. U.K. ports.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. 9d. per carboy. Dearsenicated quality, 6s. 3d. per carboy, ex works.

ACID NITRIC, 80°.—Quoted £23 5s. per ton, ex station, full truck loads.

ACID OXALIC.—Still in good demand and price unchanged at 3d. per lb., ex store, spot delivery. Offered from the Continent at 2⅞d. per lb., ex wharf.

ACID SULPHURIC, 144°.—£3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC B.P. CRYSTALS.—In good demand and price advanced to about 1s. 3¾d. per lb., less 5% ex wharf.

ALUMINA SULPHATE, 17/18% IRON FREE.—Spot material quoted £5 12s. 6d. per ton, ex store. On offer for early delivery at £5 5s. per ton, c.i.f. U.K. ports.

ALUM POTASH.—Continental price higher. Lump quality now quoted £8 5s. per ton, c.i.f. U.K. ports. Crystalline powder, 2s. 6d. per ton extra. Lump on spot quoted £9 2s. 6d. per ton, ex store.

AMMONIA ANHYDROUS.—Unchanged at about 9d. per lb., carriage paid, containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton; packed in 5-cwt. casks delivered or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of English manufacture quoted £23 to £24 per ton, ex station. Continental material on offer at about £19 15s. per ton, c.i.f. U.K. ports. Fine white crystals quoted £18 per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Again easier at about £17 10s. per ton, ex wharf, prompt despatch from mines. Spot material now quoted £18 15s. per ton, ex store.

BARIUM CARBONATE, 98/100%.—White powdered quality quoted £6 15s. per ton, c.i.f., U.K. ports.

BARIUM CHLORIDE, 98/100%.—Large white crystals quoted £7 7s. 6d. per ton, c.i.f. U.K. ports, packed in casks. Bags, 5s. per ton less. Spot material now quoted £9 per ton, ex store.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—Contract price to consumers, £8 per ton, ex station, minimum 4-ton lots. Spot material, 10s. per ton extra.

BORAX.—Granulated, £19 10s. per ton; crystals, £20 per ton; powder, £21 per ton, carriage paid U.K. ports.

CALCIUM CHLORIDE.—English manufacturers' price unchanged at £5 to £5 5s. per ton, ex station, with a slight concession for contracts. Continental cheaper at about £3 10s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports, for export.

COPPER SULPHATE.—Continental material now quoted £25 per ton, c.i.f. U.K. ports. British material on offer at about the same price f.o.b. nearest port.

FORMALDEHYDE 40%.—Unchanged at £38 per ton, c.i.f. U.K. ports, spot material quoted £39 5s. per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 15s. per ton, c.i.f. U.K. ports.

LEAD, RED.—Imported material quoted £33 per ton, ex store.

LEAD, WHITE.—About £33 5s. per ton, ex store.

LEAD ACETATE.—White crystals offered from the Continent at £42 7s. 6d. per ton, c.i.f. U.K. ports; brown, about £40 5s. per ton, c.i.f. U.K. ports; white crystals offered on spot at about £43 15s. per ton, ex store.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store, in moderate demand.

POTASH CAUSTIC 88/92%.—Solid quality quoted £28 15s. per ton, c.i.f. U.K. ports, minimum 15-ton lots. Under 15-ton lots, £29 10s. per ton. Liquid, £15 per ton, minimum 15-ton lots. Under 15-ton lots, £15 7s. 6d. per ton, c.i.f. U.K. ports.

POTASSIUM BICHROMATE.—Unchanged at 4½d. per lb., delivered.

POTASSIUM CARBONATE, 96/98%.—Quoted £27 5s. per ton, ex wharf, early shipment. Spot material on offer at about £28 10s. per ton, ex store.

POTASSIUM CHLORATE.—Powdered quality on offer at £24 5s. per ton, c.i.f. U.K. ports. Crystals, £2 per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 12s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £21 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 6½d. per lb., ex store, spot delivery.

POTASSIUM PRUSSIATE (YELLOW).—In good demand and price unchanged at about 7½d. per lb., ex store, spot delivery. Offered for shipment at 7¼d. per lb., c.i.f. U.K. ports.

SODA CAUSTIC.—Powder 98/99%, £19 7s. 6d. per ton; 76/77%, £15 10s. per ton; 70/72%, £14 10s. per ton, carriage paid station, minimum 4-ton lots on contract. Spot material, 10s. per ton extra.

SODIUM ACETATE.—English material quoted £22 per ton, ex store. Continental rather higher at about £17 17s. 6d. per ton, c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¼d. per lb., delivered buyers' works.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powder or pea quality, £1 7s. 6d. per ton; alkali, 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 10s. per ton, ex store, minimum 4-ton lots. Continental on offer at about £8 2s. 6d. per ton, ex wharf, prompt shipment. Pea crystals of British manufacture quoted £15 5s. per ton, ex station, 4-ton lots.

SODIUM NITRATE.—Ordinary quality quoted £13 per ton, ex store. Refined quality, 5s. per ton extra.

SODIUM NITRITE, 100%.—Spot material quoted £20 15s. per ton ex store.

SODIUM PRUSSIATE (YELLOW).—Offered for prompt shipment, from the Continent at 4¼d. per lb., ex wharf. Spot material on offer at 4¼d. per lb., ex store.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption £3 7s. 6d. per ton, ex works.

SODIUM SULPHIDE.—60/65%. Solid, £11 10s. per ton; broken, £12 10s. per ton; cakes, £12 10s. per ton; flake, £14 5s. per ton; crystals, 31/34%, £7 15s. to £8 10s. per ton, according to quality, delivered buyers' works, minimum 4-ton lots on contract. Prices for spot delivery are 5s. and 2s. 6d. per ton extra for solid and crystals respectively. Offered from the Continent at about £9 7s. 6d. per ton, c.i.f. U.K. ports; broken, 15s. per ton extra.

SULPHUR.—Flowers, £12 10s. per ton; roll, £11 10s. per ton; rock, £11 10s. per ton; floristella, £10 10s. per ton; ground American, £9 5s. per ton; ex store. Prices nominal.

ZINC CHLORIDE.—British material, 98/100%, quoted £24 15s. per ton, f.o.b. U.K. ports; 98/100%, solid on offer from the Continent at about £21 15s. per ton, c.i.f. U.K. ports; powdered, 20s. per ton extra.

ZINC SULPHATE.—Continental material on offer at about £10 10s. per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Intermediates

GAMMA ACID.—4s. 9d. per lb. per 100%. Some home inquiries.
NAPHTHIONIC ACID.—1s. 4½d. per lb. Some inquiries.
BENZALDEHYDE.—2s. 3d. per lb. Small inquiries.
DIMETHYLANILINE.—1s. 11d. per lb. Some inquiries.
PARANITRANILINE.—1s. 8d. per lb. Some inquiries.

PRIZES TO THE VALUE OF $17,500 are being offered by the American Society of Mechanical Engineers (on behalf of the Lincoln Electric Co., of Cleveland, Ohio), for the three best papers (from any part of the world) disclosing advancement in the art of arc welding. Regulations may be obtained from the American Society of Mechanical Engineers, 29, West Thirty-ninth Street, New York, U.S.A.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, June 16, 1927.

Business in this part of the country was virtually at a standstill during the greater part of last week and, to some extent, the holiday atmosphere is still prevalent, for the markets have not yet resumed what may be regarded as their normal degree of activity. As regards chemicals, inquiry both for home consumption and for shipment on this market has been very moderate during the week, though with one or two exceptions values keep up fairly well.

Heavy Chemicals

Sulphide of sodium shows little actual change, but the demand for this is rather slow; the commercial product is quoted at £8 10s., and the 60-65 per cent. concentrated solid at £12 15s. per ton. Bicarbonate of soda moves off in fair quantities and quotations keep steady at about £10 10s. per ton. Only a quiet trade is passing in phosphate of soda, and the tendency is easy at £12 15s. per ton. Hyposulphite of soda continues to be offered at from £15 5s. to £15 10s. per ton for photographic and about £9 12s. 6d. for commercial and a moderate inquiry is reported. Saltcake is in fair request without much actual alteration in price levels, round £3 12s. 6d. per ton being quoted. Prussiate of soda is maintained at 4¼d. per lb. and a quiet business is being put through. Caustic soda continues firm and in quietly steady demand at from £14 10s. to £16 10s. per ton, according to quality. Alkali, which is quoted at about £6 15s., is in much the same position. Bichromate of soda attracts a fair amount of attention from buyers and values are steady at from 3d. to 3¼d. per lb. Nitrite of soda is on offer at round £19 per ton, although the demand in this section is rather quiet. Glauber salts are dull and current quotations for this are in the neighbourhood of £3 5s. per ton. Bleaching powder is well held at £8 per ton and inquiry is on a fair scale. Chlorate of soda is still being offered on this market at about 2⅞d. per lb., but there has been little improvement in the demand for this material.

Current offers of carbonate of potash are from £27 to £27 5s., and a moderate business is being done. Caustic potash also is fairly active, and values are firm at from £29 to £30 10s. per ton, according to quantity. There is only a quiet demand for permanganate of potash, but prices are held at 6¾d. per lb. for the B.P. quality and round 5¼d. for the commercial. Chlorate of potash is quoted at 3⅝d. to 3¼d. per lb., but inquiry is still rather poor. Bichromate of potash is steady and in moderate request at 4d. to 4¼d. per lb. Yellow prussiate of potash has been generally quoted this week at about 7½d. per lb. with business rather slow.

There is only a quiet trade being put through in the case of arsenic, and values are easy at about £15 15s. per ton at the mines for white powdered, Cornish makes. Sulphate of copper keeps steady and meets with a moderate demand for export at round £25 10s. per ton, f.o.b. Nitrate of lead is a trifle stronger at £38 5s. per ton, although there has only been a limited inquiry for this during the past week. Acetate of lead remains on the quiet side, but values are steady at about £43 10s. per ton for white material and £41 for brown. Acetate of lime also is in limited request at about £8 5s. per ton for brown quality and £15 10s. for grey.

Acids and Tar Products

The demand both for tartaric and citric acids is capable of much improvement but values in each case are firm, tartaric being quoted this week at 1s. 3d. per lb. and citric at 1s. 6¼d. to 1s. 6½d. There is not much doing in oxalic acid, though prices are about unchanged at 2⅞d. to 3d. per lb. Acetic acid moves off in moderate quantities at round £66 10s. per ton for glacial and £37 for commercial quality.

On continued scarcity of spot offers and a fairly steady inquiry, pitch is rather firmer at from £3 15s. to £3 17s. 6d. per ton. Solvent naphtha is inactive and prices are weak at about 1s. 2d. per gallon, delivered. For carbolic acid there is little inquiry at the moment, but crystals are still quoted at about 8¼d. per lb. and crude at 2s. 4d. per gallon. Creosote oil is well maintained at 7¼d. to 7½d. per gallon, and a fair amount of activity has been reported during the week.

Billingham Output of Fixed Nitrogen

In an article in the *Financial Times*, Sir Max Muspratt states that at the nitrogen fixation plant at Billingham-on-Tees, the property of Synthetic Ammonia and Nitrates, now included under Imperial Chemical Industries, the output of fixed nitrogen is 18,000 tons per annum. By the end of next year the output will have been increased greatly. Sulphate of ammonia is the principal product, but ammonium nitrate, bicarbonate of ammonia, urea, and other nitrogenous bodies are being produced, or will be produced, within a few months. In regard to the general question of nitrogen fixation, Sir Max says that several processes for the manufacture of ammonia have been developed of late years, with which the names of Claude, Casale, Fauser, and others are associated. They are based on cheap electric power or upon the coal and coke industry in one way or another. Each will find a place in the nitrogen industry for the present. Some may fall by the wayside when the world becomes more nearly saturated with nitrogenous fertilisers. In this connection it must be remembered that the actual synthesis of ammonia is not all. Ammonia must be fixed in solid form as one of its salts or as some other nitrogen compound made from it. The economic factors introduced by this necessity frequently determine the fate of a factory for nitrogen fixation.

Annual Meeting of Boots Pure Drug Co.

The annual general meeting of Boots Pure Drug Co., Ltd., was held on Thursday, June 9, in Nottingham. Mr. John C. Boot (the chairman) said that the trading profit was £789,146, as against £849,645. After making various charges for pensions, etc., there was a net profit of £641,732, as against £688,472. After payment of dividends there was a balance of £184,983, which, together with the credit balance from 1926, made an available total of £419,334. The directors recommended the transference of £150,000 to reserve (bringing it up to £550,000) and £100,000 to a "works development fund," and that the last interim dividend of 6 per cent., less tax, be the final one for the year ended March, 1927, leaving £169,334 to be carried forward. There was an urgent need, he said, for new factories, and the directors had finally bought 200 acres of land between Dunkirk and Beeston. They proposed to build a section for their soap and toilet departments, and to develop the remainder of the land as and when required. It was in view of these developments that they thought it wise to set aside the sum of £100,000 as a fund out of which they could pay for the inevitable expense of transferring departments to a new site. During the past year they had reorganised the scientific and research side of their business.

Therapeutic Substances Regulations

Under the date May 31, there have been issued the regulations governing the sale of substances specified in the Therapeutic Substances Act, 1925. The substances in the present schedule include insulin, salvarsan and various derivatives thereof, vaccines, toxins, antitoxins, etc. The regulations require that a licence be taken out for the manufacture of the substances set out, and provision is made with regard to containers, labelling, etc. The regulations will come into force on August 6, except those regarding labelling, which come into force on February 6, 1928. The Minister of Health has intimated to the Association of British Chemical Manufacturers that in the initial period of operation some latitude will be allowed, to permit of clearance of existing stocks. In regard to derivatives of salvarsan, the regulations state that "in the case of any derivative of arsenobenzene other than those specified . . . the applicant for a manufacturing or import licence shall submit to the Licensing Authority with his application a statement of the true chemical nature and composition of the derivative."

Company News

ANGELA NITRATE CO.—The directors recommend a final dividend of 5 per cent., less income tax, making a total of 10 per cent. for the year ended December 31, 1926.

COURTAULDS, LTD.—A dividend on the 5 per cent. cumulative preference shares, will be paid on July 1 next, to shareholders on the books at the close of business on June 9.

"SANITAS" CO.—For the year ended March 31 last the balance available, including £1,123 brought forward, amounted to £61,486. A final dividend of £35,000 on ordinary shares is proposed, making £45,000 for the year; leaving £1,834 to be carried forward.

J. E. AND J. FIELD.—The report for the year ended March 31 last states that the profit and loss account shows that, after providing for repairs and depreciation, there is a credit of £21,031. The board recommends a dividend of 10 per cent. on the ordinary shares less income tax, carrying forward £7,031.

ROSARIO NITRATE CO.—The report for the year ended December 31, 1926, states that the gross profit and transfer fees amount to £51,804, and after providing for British income tax £7,000, Chilean income and municipal taxes £6,151, interest £10,623, London expenses £5,706, amortisation of grounds and depreciation of plant and machinery £21,692, repairs and renewals at Oficina "Rosario" £28,982, closing down and stoppage expenses £22,183, result is a loss of £50,533. Deducting balance brought forward of £30,458, there remains a debit on profit and loss account of £20,075.

BELL'S UNITED ASBESTOS CO.—The directors have decided to make an issue of 140,000 6½ per cent. cumulative preference shares of £1 each at 21s. per share, and 56,468 ordinary shares of £1 each at 27s. 6d. per share. Applications are invited from the preference and ordinary shareholders, applicants for preference shares being entitled to apply for one ordinary share in respect of every complete multiple of three preference shares applied for. Any allotment that may be made will be in the same proportion. Applications for ordinary shares alone will not be entertained (subject to the reservation referred to below), but applications for preference shares alone will be considered. Of the new ordinary shares 9,802 (being the number in excess of those which applicants for preference shares will be entitled to have allotted to them) are reserved for issue to employés, customers and others who, in the opinion of the directors, are able to advance the interests of the company.

CAPE ASBESTOS CO.—For the year ended December 31, 1926, the report states that the accounts show a profit, after provision for taxation and bad and doubtful debts, and including income from Capamianto S.A.I., Turin, of £36,766, to which is added balance brought forward of £10,491, making £47,257. To reserve fund (thereby increasing amount to £90,000) has been placed £15,000, and to staff benefit fund £2,500. Directors recommend a dividend of 10 per cent. per annum (less income tax) on ordinary shares, and a dividend to preference shareholders of an amount equivalent to dividend (less income tax) on ordinary shares, under terms of issue dated December 15, 1910, which will require £7,200, carrying forward £11,757. Despite adverse conditions caused by coal strike and by increased competition, the year's profits show a substantial advance, with result that although same dividend as last year, viz., 10 per cent., is payable on an increased capital, reserve fund is augmented by £15,000, thus bringing that fund to 50 per cent. of issued capital.

ANGLO-CHILEAN CONSOLIDATED NITRATE CO.—The report for the year ended December 31, 1926, states that by reason of construction expenditures in 1926 fixed assets, after deducting depreciation, increased during 1926 approximately $10,000,000, with a resultant marked change in current assets and liabilities, the company was obligated by Chilean law, in order to complete its purchase of Coya Norte and Anglo Chilian Nitrate and Railway Co. lands, to become a member of Association of Producers of Chilian Nitrate, which sold all nitrate produced by its members at prices fixed by it and allocated sales *pro rata* among its members. As a consequence of policies pursued by Association, sales of nitrate were reduced, and production was correspondingly curtailed, resulting in depression throughout industry. On January 1, 1926, 58 out of 149 nitrate plants within the Republic of Chile were already shut down. Company then had on hand large unsold stocks. Foreseeing result of policies of Association, company closed its Peregrina plant in February, 1926. Its Santa Isabel plant was closed in October, 1926. During the year 63 additional plants were closed out of 91 which had been operating in Chile on January 1, 1926, but three plants were opened, including therein company's new oficina Maria Elena. At end of year only 31 plants out of 150 were running. During year company's total nitrate shipments, as allocated to it by Association, were only 49,559 tons, as against the productive capacity of three old plants of 150,000 tons, which productive capacity would have been available under free nitrate sales. Company served notice on Association in January of this year that it would not continue sale of its nitrate through Association, and as a result has been free to sell its own nitrate since April 14, 1927, in any manner and at such prices as it desires. Early in 1927 it established its own selling organisation in United States and all foreign markets, and is now selling its product at satisfactory prices and volume. Because of the improved outlook resultant from free nitrate sales, three old plants of company are being reopened.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CHEMICALS.—A traveller in industrial and fine chemicals in Europe is about to establish himself in Genoa or Milan as a commission agent on his own account, and is open to represent British chemical firms in Italy. (Reference No. 624.)

IODINE.—The Department of Public Health, Cairo, is calling for tenders for the supply of 500 boxes (of six) ampoules metallic iodine. Tenders must be presented in Egypt by noon on July 20. (Reference B.X. 3572.)

ALUMINIUM PAINT.—The Municipal Council of Johannesburg is calling for tenders to be presented by July 14 for the supply of 250 Imperial gallons of aluminium paint. (Reference B.X. 3568.)

METALS.—A Japanese firm wishes to form a connection with British firms dealing in metals. (Reference No. 626.)

FERRO-MANGANESE.—The Director-General, India Store Department, Branch No. 10, Belvedere Road, Lambeth, London, S.E.1, invites tenders for 45 tons of ferro-manganese, 76 to 80 per cent. manganese, due on July 5. Specifications and forms of tender from the Director-General at the above address.

British Celanese: Directors Removed from Office

THE eighth ordinary general meeting of British Celanese, Ltd., was held in London on Wednesday. The adoption of the report and accounts was moved by the chairman of the company, Major-General G. P. Dawnay, and seconded by Sir Philip G. Henriques (the representative of the Government on the board). An amendment, requiring the omission of certain paragraphs, was moved by Dr. H. Dreyfus, who denied that the board had a progressive policy. The motion, as amended, was carried, as was a further motion by Dr. Dreyfus that Mr. Alexander Clavel be re-elected a director. Special resolutions had been put forward by Dr. Dreyfus for the removal of Mr. J. G. Raphael, Mr. Chandler, Captain Guest, Mr. Roberts, and Mr. Sandeman from the board. The two last named having already resigned, resolutions for the removal of the others were put and carried. The chairman said that, subject to final checking, there were in favour of these resolutions 4,039,689 votes, and against 633,389. Colonel Bristow asked whether the latter figure included approximately 500,000 votes cast by the Government; was it a fact that of the independent shareholders only 133,000 votes had been recorded in favour of the three gentlemen? Sir Philip G. Henriques said that his instructions were to support General Dawnay, and he had done so.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

Satisfaction

FERNS EMULSIFIERS, LTD., London, E.C. (M.S., 18/6/27.) Satisfactions registered June 2, £1,100, part of amount registered September 3, 1924, and £1,900, part of amount registered July 30, 1925.

County Court Judgment

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

SENIOR CROZIER AND CO., LTD., Union Works, Union Street, Stratford. (C.C., 18/6/27.) chemical manufacturers. £14 2s. 1d. May 3.

Receivership

LAMPLOUGH (F.), AND CO., LTD. (R., 18/6/27.) H. T. Holmes, of 49, Westbury Road, Wembley, was appointed Receiver and Manager on May 31, 1927, under powers contained in trust deed dated July 10, 1923.

New Companies Registered

BRITISH SUGAR DEVELOPMENTS, LTD.—Registered June 8. Nom. capital, £5,000 in £1 shares. Sugar refiners and manufacturers, dealers in sugar, sugar beet, and all kinds of vegetable products or other substances from which sugar is extracted; manufacturing and general chemists, etc. Subscribers: G. Boggis, 7, Hornsey Lane Gardens, Highgate, London, N.6, and Jessie M. Thorpe.

"L. AND N." BROWN COAL, LTD., York Mansion, Petty France, London, S.W.1. Registered as a "public" company on June 14. Nom. capital, £250,000 in £1 shares (100,000 9 per cent. cumulative preference and 150,000 ordinary). Colliery and quarry owners, manufacturers, refiners, exporters, importers, producers, factors and wholesale and retail merchants of coal, brown coal, lignite, coke, briquettes, oil, fuel of all kinds, and all products and substances which can be made or extracted by distillation or otherwise from coal, earth, refuse, shale, rocks, ores or minerals, etc.

COLOURS AND GENERAL SUPPLIES, LTD.—Registered June 9. Nom. capital, £300 in £1 shares. To acquire certain contracts for purchases and sales of red oxide and other colouring substances, and also certain commission agreements held by J. H. Kirwan, of 578, Osmaston Road, Derby, and to carry on the business of manufacturers of and dealers in paints, enamels, shellac, gums, copals, varnishes, polishes, distempers, earth and other colours, etc. Directors: A. Thompson, Allermuir, Ramsden Road, Rotherham, and J. Woffenden.

COOMBSDALE MINING CO., LTD. Registered June 11. Nom. capital, £10,000 in £1 shares. To enter into an agreement with Cupola Mining and Milling Co., Ltd., and to carry on the business of lead miners, spar and barytes and mineral merchants carried on by the said company at The Sallett Hole Mine, Ashford, Derby. Director: E. P. Deas, 4, St. Nicholas Buildings, Newcastle-on-Tyne.

KENT AND DISTRICT TAR DISTILLERS, LTD. Registered June 11. Nom. capital, £100 in £1 shares. Manufacturers of and dealers in coke, coal, tar, pitch, ammoniacal liquor and other residual products, alizarine, coal tar, colours, dyes and dyestuffs, chemicals and chemical products, etc. Subscribers: H. G. J. Withington, The Gables, Francis Road, Stechford, Birmingham, and H. C. Chambers.

Anglo-German Industrial Discussions

WELCOMING the English industrialists visit to Leverkusen, Dr. C. Duisberg (states an *Exchange Telegraph* message) has seized the opportunity to publish in the German Press his views on these new discussions between representatives of the industries of both countries. He said that it was not a matter of drawing up a definite programme, but of entering into negotiations on certain economic questions, which, in future, might lead to practical results. The most important point was the matter of international cartels. The question as to how far such international agreements would affect individual industries was to be discussed by the individual groups. Therefore, representatives of the iron and steel industry, of the mining, the machinery, chemical, electro-technical, textile industries, of the banks, and of the shipping industry were meeting at Leverkusen. It was hoped and expected that the representatives of various individual industries would reach international agreements, which should be effected in the way of treaties juridically established.

The discussions were begun on Saturday, June 11, and continued till Monday. Among the British representatives was Sir Max Muspratt, while on the German side chemistry was represented by Dr. Duisberg, Dr. von Simson, and Carl von Weinberg. The official communiqué stated that there was warm approval of the proposal that "a more intimate understanding should be promoted between agriculture and industry. It was agreed that the exchange of professors and students between all countries was desirable in the interest of improved industrial and cultural relations, and the members of the conference undertook to take steps for an extension of a movement of this nature in their respective countries. The eight hours convention of the Washington Conference was considered, and the peculiar circumstances affecting the productive industry of Great Britain and Germany were explained on both sides." It is believed that certain resolutions were adopted, but the nature of these has not been disclosed.

Position of British Sugar Beet Society

A PROPOSAL to wind up the British Sugar Beet Society, made by the executive committee, came up before a meeting of members on Tuesday. There were eight present, and the voting was equal. The Right Hon. G. H. Roberts, presiding, moved the adoption of the recommendation, and said the committee made it with a profound sense of regret, but they must face the facts. The Society had now accomplished the purpose for which it was founded. Sir James Martin seconded. Colonel Royds moved an amendment that there was much useful work yet to be done by the Society, and requesting the committee to report on the conditions under which the Society should operate in future. Mr. V. A. Malcolmson seconded the amendment. The chairman suggested that those who opposed the dissolution of the Society should form themselves into a sub-committee to consult with the executive. This suggestion was agreed to, and the meeting was adjourned.

Benn Brothers' Other Journals

THE GAS WORLD.—Annual Meeting of the Institute of Gas Engineers; Use of Reinforced Concrete in Gasworks; Gas Sales Development in the Small Undertaking.

TIMBER TRADES JOURNAL.—Canada's Forest Resources; About American Walnut; Activity on the Pacific Coast; The Evolution of the Saw Tooth.

THE CABINET MAKER.—Training the Craftsman; The Architect and the Furnisher; Furniture Shipments in May.

GARDENING ILLUSTRATED.—Staking Border Flowers; Comments on the Chelsea Show; The Rhododendron Bug; The Pot Culture of Annuals for Autumn Blooming in the Greenhouse.

THE FRUIT GROWER.—The Hive Bee in the Orchard; Control of Apple Mildew; Further Impressions of the Kent Tour (illustrated).

THE ELECTRICIAN.—The I.E.E. Summer Meeting; "Electric Drive for Laundries," by J. O. Knowles; "Small Hydro-Electric Plants," by F. Johnstone Taylor.

THE HARDWARE TRADE JOURNAL.—What a Census of Distribution Shows; The Percentage of Hardware Sales; Wireless Trade in the Summer Months; Merchandise Marks Inquiry; Wire Netting and Woven Wire.